# NEW APPLICATION ORIGINAL

#### RECEIVED



FENNEMORE CRAIG
A Professional Corporation
Jay L. Shapiro (No. 014650)
3003 North Central Avenue
Suite 2600

Phoenix, Arizona 85012 Telephone (602) 916-5000 2005 FEB | | □ 4: 35

AZ CORP COMMISSION DOCUMENT CONTROL

Arizona Corporation Commission

OCKETED

FEB 1 1 2005

DOCKETED BY



Attorneys for Johnson Utilities Company

WS-02987A-05-0088

#### BEFORE THE ARIZONA CORPORATION COMMISSION

IN THE MATTER OF THE APPLICATION OF JOHNSON UTILITIES COMPANY FOR AN EXTENSION OF ITS EXISTING CERTIFICATE OF CONVENIENCE AND NECESSITY FOR WATER SERVICE.

DOCKET NO. WS-02987A-05-

APPLICATION FOR EXTENSION OF CERTIFICATE OF CONVENIENCE AND NECESSITY

Johnson Utilities Company, L.L.C. ("Applicant"), an Arizona public service corporation, hereby applies for an Order approving an extension of its existing Certificate of Convenience and Necessity ("CC&N") for water and wastewater service to include an area encompassing the development known as Quail Run ("the Development"). In support of this Application, Applicant states as follows:

- 1. Applicant is a public service corporation engaged in providing water and wastewater utility service, respectively, for public purposes within portions of Pinal County, Arizona. Applicant was first granted a CC&N in Decision No. 60223 (May 27, 1997), and currently serves approximately 8500 water and wastewater utility customers. The area served by Applicant contains both residential and commercial properties.
- 2. Standard Pacific of Arizona, Inc. ("Standard Pacific") has requested that Applicant extend water and wastewater utility service to the Development, located in Section 24, Township 3 South, Range 8 East in Pinal County, Arizona. A copy of this request for service is attached hereto as Exhibit 1.
- 3. The area covered by this Application is roughly 100 acres, and will contain approximately 351 residential lots. The Development is to be constructed in phases, and Standard

PROFESSIONAL CORPORATION

PHOENIX

Pacific estimates that home construction and sales will commence in the second half of 2005.

- 4. A legal description for the area covered by this Application is attached hereto as Exhibit 2.
- 5. Applicant's management contact is Brian Tompsett of Johnson Utilities Company, whose business address is 5230 East Shea Boulevard, Suite 200, Scottsdale, Arizona 85254. The telephone number is (480) 998-3300.
- 6. Applicant's operator, certified by the Arizona Department of Environmental Quality, is Tom Moulton, whose business address is 968 E. Hunt Hwy, Queen Creek, Arizona. The telephone number is (480) 987-9870.
- 7. Applicant's attorneys are Fennemore Craig, whose address is 3003 North Central Avenue, Suite 2600, Phoenix, Arizona 85012-2913. The individual attorney responsible for this application is Jay L. Shapiro. Mr. Shapiro's telephone number is (602) 916-5366. All Data Requests or other Requests for Information should be directed to Mr. Brian Tompsett, with a copy to Mr. Shapiro's attention, on behalf of Johnson Utilities Company.
- 8. A Certificate of Good Standing for Johnson Utilities Company is attached hereto as Exhibit 3.
- 9. The newly acquired customers in the area covered by the application will receive water service subject to Applicant's current rates and charges for utility service, which were approved in Decision No. 60223 (May 27, 1997).
- 10. A detailed map indicating portions of Applicant's present CC&N and the area requested for extension by this Application is attached hereto as <u>Exhibit</u> 4.
- 11. Applicant's balance sheet and profit and loss information for the 12-month period ending 2003 is attached hereto as Exhibit 5.
- 12. A copy of the master water design report and master wastewater design report for the Development is attached hereto as Exhibit 6.

A copy of Applicant's most recent Annual Report (2003) is attached hereto as 1 13. 2 Exhibit 7. The estimated numbers or customers to be served in each of the first five years of 3 14. 4 water utility service to the area covered by this Application are as follows: 5 Residential 6 1<sup>st</sup> Year: 151 2<sup>nd</sup> Year: 351 7 3<sup>rd</sup> Year: 351 4<sup>th</sup> Year: 351 8 5<sup>th</sup> Year: 351 9 Applicant's estimated annual operating revenue and operating expenses for each of 15. 10 the first five years of operation in the new area covered by this Application are as follows: 11 12 **WATER** 13 **Operating Expenses** Operating Revenue 14 1<sup>st</sup> Year - \$48,169 1<sup>st</sup> Year - \$45,199 2<sup>nd</sup> Year - \$150,706 2<sup>nd</sup> Year - \$114,380 15 3<sup>rd</sup> Year - \$206,388 3<sup>rd</sup> Year - \$150,698 4th Year - \$152,424 4th Year - \$206,388 16 5<sup>th</sup> Year - \$153,057 5<sup>th</sup> Year - \$206,388 17 18 WASTEWATER 19 20 Operating Revenue Operating Expenses 1<sup>st</sup> Year - \$28,854 21 1<sup>st</sup> Year - \$38,083 2<sup>nd</sup> Year - \$60,795 3<sup>rd</sup> Year - \$76,840 2<sup>nd</sup> Year - \$126,605

3<sup>rd</sup> Year - \$177,046

4<sup>th</sup> Year - \$177,046 5<sup>th</sup> Year - \$177,046

The plant cost projections, including service meters, by year for the next five (5) 16. years are as follows:

4<sup>th</sup> Year - \$78,361 5<sup>th</sup> Year - \$78,938

22

23

24

25

#### **Plant Cost Projection**

	Water	Wastewater
1 <sup>st</sup> Year -	\$789,484	\$769,175
2 <sup>nd</sup> Year -	\$789,484	\$769,175
3 <sup>rd</sup> Year -	\$789,484	\$769,175
4 <sup>th</sup> Year -	\$789,484	\$769,175
5 <sup>th</sup> Year -	\$789,484	\$769,175

- 17. The water and wastewater facilities needed to serve the area covered by this Application will be constructed as needed to provide service to customers.
- 18. The construction of the additional utility facilities needed to serve the area covered by this Application will be financed primarily by advances in aid of construction and hook-up fees in accordance with Commission regulations and Applicant's applicable tariffs, as well as pursuant to the terms of any main extension agreement between Applicant and Standard Pacific. A copy of a fully executed main extension agreement for water facilities between the parties shall be filed with the Commission in support of this Application when completed.
- 19. The Development is located within the boundaries of Applicant's present Pinal County franchise.
- 20. Arizona Department of Environmental Quality ("ADEQ") Approvals to Construct the facilities to serve the requested extension area will be provided to the Commission as soon as they are received by Applicant.
- 21. Notice of this Application will be given by publication in a newspaper of general circulation as required by the Commission. Proof of publication will be filed with the Commission.
- 22. Applicant maintains that this Application is in the public interest and should be granted. There is a present need for water and wastewater service in order to foster orderly growth in Pinal County, as evidenced by the developer's requests that Applicant extend such

utility service. Furthermore, Applicant is the largest water and wastewater utility provider in the area. Therefore, in addition to the advantages of an increased regionalized customer base, granting this Application will allow customers in the area to receive water and wastewater utility service from one provider. Furthermore, granting this Application will allow the Applicant and its customers to benefit from economies of scale in administration and planning, as well as benefits related to billing and collection, that are present when water and wastewater is provided by a single entity.

23. To the best of its knowledge and belief, Applicant is currently in compliance with all regulatory requirements applicable to its provision of water and wastewater utility service in Arizona, including all applicable orders, rules and regulations of the Commission and ADEQ.

WHEREFORE, Applicant respectfully requests the following:

- A. That the Commission proceed to consider and act upon this Application as timely as possible and to schedule a hearing, if necessary, on this matter;
- B. That upon completion of said hearing that the Commission enter an Order approving the extension of Johnson Utilities Company's current Certificate of Convenience and Necessities to include the additional geographic areas requested by this Application as described in <a href="Exhibit 2">Exhibit 2</a>, and illustrated in <a href="Exhibit 4">Exhibit 4</a>; and
- C. That the Commission grant such other and further relief as may be appropriate under the circumstances herein.

DATED this day of February, 2005.

FENNEMORE CRAIG, P.C.

By:

Jay L. Shapiro

Attorneys for Johnson Utilities Company

ORIGINAL and 13 copies delivered this day of January, 2005, to: Docket Control Arizona Corporation Commission 1200 West Washington Street Phoenix, Arizona 85007 COPY hand-delivered this day of February, 2005: Jim Fisher, Executive Consultant Utilities Division Arizona Corporation Commission 1200 West Washington Street Phoenix, Arizona 85007 

# EXHIBIT 1 REQUESTS FOR SERVICE



December 22 2004

#### **VIA HAND DELIVERY**

Brian P. Tompsett Johnson Utilities 5230 East Shea Blvd. Suite 200 Scottsdale, AZ 85254

Re: Quail Run

Dear Brian:

As we have previously discussed, Standard Pacific is purchasing approximately 100 acres known as Quail Run located at the southeast corner of Quail Run Road and Bella Vista Road in Pinal County, Arizona. Standard Pacific anticipates that we will build 351 dwelling units on that acreage. As we also discussed, we are interested in Johnson Utilities serving the property with both water and wastewater services.

It is our understanding that Johnson Utilities will need to expand their CC&N to include this property which is located in Section 24, Township 3 South, Range 8 East.

In connection with that proposed expansion, enclosed are the following for your use:

- 1. Legal description of Quail Run. As indicated above, the gross acreage is approximately 100 acres.
- 2. Master Water Report for Quail Run prepared by Evolution Engineering L.L.C. dated December 21, 2004.
- 3. Master Wastewater Report for Quail Run prepared by Evolution Engineering L.L.C. dated December 21, 2004.
- 4. Engineer's cost estimate for the on-site infrastructure. All infrastructure will be installed in Year 1.
- 5. We estimate that the number of cumulative customers for each year will be as follows:

Brian Tompsett December 22, 2004 Page Two

Year 1	-0-
Year 2	150
Year 3	351
Year 4	351
Year 5	351

Please proceed as soon as possible with the necessary paperwork to extend Johnson Utilities' service area to include Quail Run. Standard Pacific is scheduled to close on the acquisition in February, 2005 and would anticipate beginning construction of the infrastructure at that time.

Singerely,

Carol Grumley

Vice President Land Acquisition

**Enclosures** 

cc: Patrick Black (via hand delivery)

# EXHIBIT 2 LEGAL DESCRIPTIONS

#### EXHIBIT "A"

A PARCEL OF LAND BEING SITUATE IN THE WEST HALF OF THE WEST HALF OF SECTION 24, TOWNSHIP 3 SOUTH, RANGE 8 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, PINAL COUNTY, ARIZONA, HAVING A BOUNDARY MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING FOR A TIE AT THE ARIZONA HIGHWAY DEPARTMENT BRASS CAP MARKING THE NORTHWEST CORNER OF SAID SECTION 24, FROM WHICH THE ARIZONA HIGHWAY DEPARTMENT BRASS CAP MARKING THE WEST QUARTER SECTION CORNER OF SAID SECTION 24 BEARS SOUTH 0 DEGREES 18 MINUTES 56 SECONDS EAST, 2652.01 FEET DISTANT;

THENCE NORTH 89 DEGREES 58 MINUTES 50 SECONDS EAST, 1351.43 FEET TO THE WEST 1/16 CORNER OF SAID SECTION 24;

THENCE SOUTH 0 DEGREES 16 MINUTES 45 SECONDS EAST, 40.00 FEET TO THE TRUE POINT OF BEGINNING;

THENCE CONTINUING SOUTH 0 DEGREES 16 MINUTES 45 SECONDS EAST, 2611.66 FEET TO A POINT ON THE EAST-WEST MID-SECTION LINE OF SECTION 24;

THENCE SOUTH 0 DEGREES 26 MINUTES 44 SECONDS EAST, 713.09 FEET TO THE SOUTHEAST CORNER OF SUBJECT PARCEL;

THENCE SOUTH 89 DEGREES 57 MINUTES 58 SECONDS WEST, 1307.23 FEET TO THE SOUTHWEST CORNER OF SUBJECT PARCEL, SAID POINT BEING ON THE EASTERLY RIGHT-OF-WAY LINE OF QUAIL RUN ROAD;

THENCE NORTH 0 DEGREES 38 MINUTES 54 SECONDS WEST, 713.11 FEET TO A POINT ON THE EAST-WEST MID-SECTION LINE, SECTION 24 AND FROM WHICH POINT THE WEST QUARTER SECTION CORNER OF SECTION 24 BEARS SOUTH 89 DEGREES 57 MINUTES 58 SECONDS WEST, 40.00 FEET;

THENCE NORTH 0 DEGREES 18 MINUTES 56 SECONDS WEST, ALONG THE EASTERLY RIGHT-OF-WAY LINE OF QUAIL RUN ROAD 2612.00 FEET;

THENCE NORTH 89 DEGREES 58 MINUTES 50 SECONDS EAST, 1311.40 FEET TO THE TRUE POINT OF BEGINNING.

### **EXHIBIT 3**

# CERTIFICATION OF GOOD STANDING





### Office of the CORPORATION COMMISSION

#### CERTIFICATE OF GOOD STANDING

To all to whom these presents shall come, greeting:

I, Brian C. McNeil, Executive Secretary of the Arizona Corporation Commission, do hereby certify that

\*\*\*JOHNSON UTILITIES, L.L.C. \*\*\*

a domestic limited liability company organized under the laws of the State of Arizona, did organize on the 5th day of June 1997.

I further certify that according to the records of the Arizona Corporation Commission, as of the date set forth hereunder, the said limited liability company is not administratively dissolved for failure to comply with the provisions of A.R.S. section 29-601 et seq., the Arizona Limited Liability Company Act; and that the said limited liability company has not filed Articles of Termination as of the date of this certificate.

This certificate relates only to the legal existence of the above named entity as of the date issued. This certificate is not to be construed as an endorsement, recommendation, or notice of approval of the entity's condition or business activities and practices.



IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the Arizona Corporation Commission. Done at Phoenix, the Capital, this 1st Day of December, 2004, A. D.

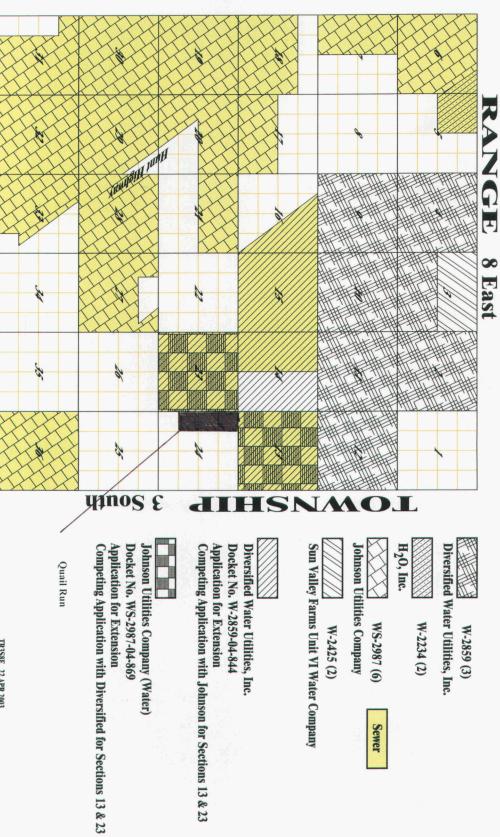
Executive Secretary

By Monne Africkes

## **EXHIBIT 4**

MAP

# COUNTY Pinal



### **EXHIBIT 5**

## BALANCE SHEET AND STATEMENT OF INCOME

#### Johnson Utilities, L.L.C. Statement of Income December 31, 2003

Operating Revenue			. •	•	
Water Sales		. •	• •		\$ 3,919,316
Sewer Fees	•				1,237,464
Other Revenue	The state of the s				101,170
Total Revenue				· · · · · · · · · · · · · · · · · · ·	\$ 5,257,950
• .		*			
• •	•		:		
Operating Expenses					<b>D</b> 000 000
Purchased Water					\$ 222,808
Purchased Power		5			291,396
Repairs & Maintenance	•		•		12,099
Outside Services	•			-	1,203,322
Water Testing		-		•	52,163
Rents			•		117,648
Transportation					557
Insurance					28,964
Sludge Removal		•• •			2,685
Miscellaneous Operating	Expense				41,641
Depreciation and Amortic	zation		**		<b>419</b> ,049
Taxes Other Than Incom					2,089
Property Taxes					71,731
Total Operating	Expenses	•			\$ 2,466,152
Net Operating In	come				\$ 2,791,798
Other Income (Expenses)				-	
Interest Income	× .		-		\$ 18,662
Interest Expense					(79,211)
Total Other Inco	me (Expenses)	-	. '		\$ (60,549)
Net Income					\$ <u>2,731,249</u>

#### Johnson Utilities, L.L.C. Balance Sheet December 31, 2003

#### **ASSETS**

443.52.44. \$5.5.44.b.		
<u>Itility Plant</u> Plant in Service	\$	40,382,861
Less: Accumulated Depreciation	. •	(2,046,608)
Net Utility Plant in Service	\$	38,336,253
Net Dunky Flant in Orivite	*-	
Construction Work in Progress		6,899,861
· · · · · · · · · · · · · · · · · · ·	s	45,236,114
Net Utility Plant	Ψ	40,200,114
turned Areate		
urrent Assets Cash	\$	684,314
Accounts Receivable	•	1,476,030
Other Receivables		38,000
Total Current Assets	\$_	2,198,344
TOTAL CONTAIN MOSELS	<b>-</b>	21.00,01.1
Other Assets		
<u>mer Assers</u> Deferred Legal Fees	\$	553,533
Land Held For Investment	. *	70,257
•		12,670
Deposit	\$_	636,460
Total Other Assets	Ψ-	400,400
Takal Banata	T.	4R 070 918
Total Assets MEMBER'S CAPITAL & LIABILITIES	*\$_	48,070,918
MEMBER'S CAPITAL & LIABILITIES	· <b>·</b>	
MEMBER'S CAPITAL & LIABILITIES	\$_ \$_	
MEMBER'S CAPITAL & LIABILITIES  Member's Capital	· <b>·</b>	5,447,979
MEMBER'S CAPITAL & LIABILITIES Member's Capital	<b>\$</b> _	5,447,979
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction	<b>\$</b> _	5,447,979 20,149,882
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction	\$_ \$_	5,447,979 20,149,882
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction  ong-Term Debt	\$_ \$_	5,447,979 20,149,882
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction  ong-Term Debt  Current Liabilities	\$_ \$_	5,447,979 20,149,882 807,000
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction  ong-Term Debt  Current Liabilities  Accounts Payable	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions in Aid of Construction  ong-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,00
Member's Capital  Contributions in Aid of Construction  Long-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,000 715,82
MEMBER'S CAPITAL & LIABILITIES  Member's Capital  Contributions In Aid of Construction  Long-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,000 715,82 45,94
Member's Capital Contributions in Aid of Construction  ong-Term Debt  Current Liabilities  Accounts Payable Current Portion of Advances in Aid of Construction Due to Member Customer Deposits Accrued Taxes	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,00 715,82 45,94 175,97
Member's Capital  Contributions in Aid of Construction  ong-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits  Accrued Taxes  Accrued Interest	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,00 715,82 45,94 175,97 7,04
Member's Capital Contributions in Aid of Construction  ong-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits  Accrued Taxes	\$_ \$_ \$_	5,447,979 20,149,885 807,000 423,80 138,00 715,82 45,94 175,97 7,04
Member's Capital  Contributions In Aid of Construction  Long-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits  Accrued Taxes  Accrued Interest  Total Current Liabilities	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,000 715,82 45,94 175,97 7,04
Member's Capital  Contributions in Aid of Construction  Long-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits  Accrued Taxes  Accrued Interest  Total Current Liabilities	\$_ \$_ \$_	5,447,979 20,149,882 807,000 423,80 138,000 715,82 45,940 175,97 7,040 1,506,57
Member's Capital  Contributions In Aid of Construction  Long-Term Debt  Current Liabilities  Accounts Payable  Current Portion of Advances in Aid of Construction  Due to Member  Customer Deposits  Accused Taxes  Accused Interest	\$ \$ \$ \$	5,447,979 20,149,882 807,000 423,801 138,000 715,823 45,940 175,974 7,040 1,506,576

See Accountants' Compliation Report

### **EXHIBIT 6**

# MASTER WATER & WASTEWATER DESIGN REPORTS

#### RECEIVED

DEC 2 1 2004

LAND ACQUISITION

# MASTER WASTEWATER REPORT FOR QUAIL RUN

December 21, 2004

Prepared for:

Danto Real Estate Investments, Inc.

2250 E Beachcomber Dr. Gilbert, AZ 85234

Prepared by:

Evolution Engineering L.L.C. 1731 E. Orangewood Avenue

Phoenix, AZ 85020 (602) 944-1144



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FIGURE 1: VICINITY MAP

#### **APPENDICES**

APPENDIX A: PROPOSED GRAVITY SEWER COLLECTION SYSTEM LAYOUT FOR QUAIL RUN

APPENDIX B: GRAVITY SEWER COLLECTION SYSTEM SPREADSHEET

APPENDIX C: TOTAL DYNAMIC HEAD (TDH) CALCULATIONS & PUMP CURVE DATA

APPENDIX D: LIFT STATION DETAILS

#### 1.0 EXECUTIVE SUMMARY

This report describes the sewer collection system requirements for Quail Run, a single family residential development located in Pinal County. The intent of this report is to present a design and hydraulic analysis of the required sewer collection system. The system design criteria were obtained from the Johnson Utilities Company Design Guide and Standard Details as published by Johnson Utilities Company, the sewer provider for this development.

The proposed onsite gravity sewer collection system will consist of eight inch sewer lines throughout the Quail Run development. The sewage collection system described in this report considers a liftstation being installed in the Quail Run development, a force main being installed between the Quail Run liftstation and the existing Sonoran Villages development liftstation located at the Northwest corner of the intersection of Felix and Judd Road. The existing Sonoran Villages liftstation and force main were designed by Can-Am Engineering and is currently under construction as of the date of this report.

The Sonoran Villages development consists of 1,600 dwelling units but Can-Am Engineering sized the liftstation and force main associated with this project to allow for a variance. 2,000 dwelling units were used in the design of the liftstation and the sewer force main that would serve the Sonoran Villages development. The force main, designed by Can-Am Engineering and is currently under construction, will convey wastewater from the Sonoran Villages development to the Wastewater Treatment Plant (ADEQ file numbers 980215 for Phase I and 980174 for Phase II) located in a portion of the Northwest Quarter of

Section 11, Township 4 South, Range 8 East. This is located North of Hunt Highway and West of the Union Pacific Railroad.

The anticipated timing of Quail Run is such that the liftstation and force main facilities at the Sonoran Villages development will have been constructed and online prior to Quail Run project connecting to the system. It is anticipated that the Quail Run development will develop in one phase.

#### 2.0 INTRODUCTION

Quall Run is an approximate 100 acre single family residential development with a total of 351 lots located in Pinal County. The site is bounded on the North by Bella Vista Road and Quail Run Road on the West. More specifically, the site is located in a portion of West Half of the West Half of Section 24, Township 3 South, Range 8 East, of the Gila and Salt River Base and Meridian, Pinal County, Arizona. See Figure 1 below for vicinity Map.

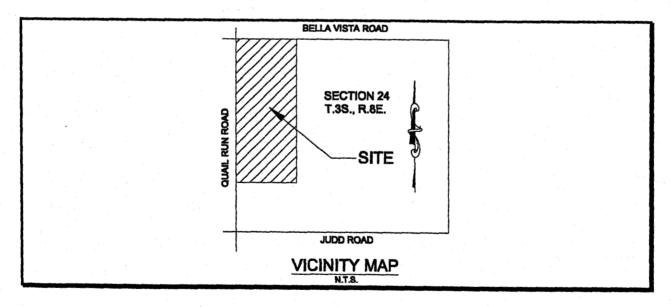


Figure 1: Vicinity Map

The site is presently undeveloped. The topographic conditions for the site contain desert terrain. The terrain generally slopes to the West. Currently this site lays outside the service area boundaries for Johnson Utilities. However, Johnson Utilities has agreed to provide sewer service to the site and is currently seeking to expand their certificated area.

The purpose of this report is to analyze and present the design of the wastewater collection system for the Quail Run project. This report recommends line sizes, locations and capacity of the proposed sewer mains for the site as well as presents the design requirements for a liftstation facility, force main and other appurtenances associated with the development of Quail Run.

#### 3.0 DESIGN CRITERIA

#### 3.1 WASTEWATER FLOWS

The design criteria used in this wastewater analysis are based on Johnson Utilities Company Design guide and Standard Details. The following is a summary of the key design criteria utilized in this report. This summary only highlights some of the key design considerations used to analyze this wastewater collection system, lift station & force main and does not in any way supercede any of the requirements as set forth by Johnson Utilities Company nor Arizona Department of Environmental Quality (ADEQ).

- 1. 90 GPCD for all residential areas requiring sewers (ADWF).
- 2. 2.6 persons/D.U. for all Family Community Residences.
- 3. 250 GPAD for wet weather flow infiltration and inflow.
- 2.42 peak dry weather flow factor for a 913 population per Table 1 of the Johnson Utilities Company Design Guide and Standard Details Manual.

#### 3.2 GRAVITY SEWER COLLECTION SYSTEM

- 1). Sewer lines shall be a minimum of 8-inch with a minimum of 4 feet of cover.
- 2). Manholes required whenever a change in sewer alignment, grade or size occurs.
- 3). Manhole inverts with 0 to 5 degrees deflection shall be constructed at the grade of the sewer line; deflections or intersections of 5.1 to 45 degrees shall drop 0.1 feet across manhole, and deflections of 45.1 to 90 degrees shall have a minimum 0.2 feet of drop across the manhole.
- 4). Maximum allowable manhole spacing is 500 feet for sewer lines less than 18-inches in diameter.
- 5). Sewer lines with invert depths greater than 12 feet or pipe size larger than 12-inches require 5 foot diameter manholes with a 30-inch diameter cover. All others require a 4 foot diameter manholes with a 24-inch diameter cover.

Note: The minimum pipe slopes for this project have been increased 15 percent over that of the ADEQ requirements for constructability measures.

Pipe Diameter 8 Adjusted Minimum Pipe Slope 0.0038

#### 3.3 LIFT STATION & FORCE MAIN

- Johnson utilities requires all lift stations to be constructed with grit chambers separate from wet wells.
- 2). All grit chambers and wet wells shall have saueriesen or sewer shield 101S applied to the inside surface.
- Force mains shall be designed to maintain a minmum flow velocity of 3 feet per second and a maximum flow velocity of 7 feet per second.

- 4). Minimum wet well volume in gallons shall be ½ of the product of the minimum pump cycle time, in minutes, and the total pump capacity, in gallons per minute.
- 5). Ensure that wet well colume does not allow the sewage retention time to exceed 30 minutes unless the sewage is aerated, chemicals are added to prevent or eliminate hydrogen sulfide formation, or adequate ventilation is provided.
- 6). Equip each wet well with at least two pumps. Pumps that are capable of passing a 2.5-inch sphere or are grinder pumps.

#### 4.0 FLOW ANALYSIS

#### 4.1 Gravity Sewer Collection System

The Manning Equation was used to determe the proposed pipe sizes for the on-site gravity sewer collection system. A roughness coefficient of 0.013 (for PVC), and a minimum velocity of 2.0 ft/s were used to determine the pipe capacity. The calculated flows and minimum pipe sizes for gravity sewer collection system are tabulated in the spreadsheet located in Appendix B.

#### 4.2 Liftstation & Force Main Flow Rate Data

**Number of Dwelling Units** 

D.U. = 351 homes

#### Estimated Wastewater Flow Rate Data

- 90 gallon per person per day
- 2.6 persons per single-family dwelling unit
- 2.42 peak dry weather flow factor for 913 population (From Table 1 of Johnson Utilities Co. Design Guide & Standard Detail)
- 250 gallons per acre per day for wet weather storm water infiltration

#### Average Dry Weather Flow Rate (ADWF)

#### Peak Dry Weather Flow Rate (PDWF)

#### Peak Wet Weather Flow Rate (PWWF)

#### 4.3 Summary of Flow Analysis

The enclosed proposed sewer layout shows the proposed gravity sewer collection system with pipe sizes, approximate manhole locations, and proposed Liftstation location (Appendix A). Actual locations, inverts, and sizes will be determined with the final design of the sewer. Sewer will be adjusted to avoid conflicts with other utilities and to conform to the site and hydrologic conditions.

#### 5.0 LIFT STATION

#### 5.1 GRIT CHAMBER

Wastewater influent to the pump station will first drop into a five foot (5') diameter chamber where heavy objects are allowed to settle to the bottom of the chamber and floating objects are screened, prior to the raw wastewater entering the pumps' wet well. The settled and screened object can be removed from the chamber, washed down at the washpad, and then transported to an approved dump site. Wash-down water at the wash-down pad will drain back to the grit chamber. The grit chamber's roof will have an easy access cover for maintenance for the removal of trapped debries and objects.

#### 5.2 DUPLEX PUMPS' WET WELL

The wet well will be an eight foot (8') diameter chamber providing a wastewater storage volume of 780 gallons before pump activation. After development produces the lift station's design flow at build out of approximately 351 dwelling units, the storage volume represents approximately 5 minutes of peak wet weather flow (design PWWF=156 gpm). The wet well will have a pump hoist and guide rail system for raising and lowering of the pumps. The volume of wastewater in the wet well will be detected by electric liquid level sensors. The bottom of the wet well will be sloped towards the pumps' vortex. The roof of the wet well will contain a discharge piping for the pumps as well as the submersible pumps. Appendix 'D' shows the design for the wet well.

#### 5.3 DUPLEX PUMPS

A duplex pump system is proposed in order to maintain pumping capacity in the event that one pump fails as well as meet the peak wet weather flow rate demands (PWWF = 156 gpm) 60 horsepower, 3 phase, 460 volt, 3450 RPM, centrifugal, 4" non-clog, 3" solids handling, submersible, wastewater pumps capable of pumping 156 gallons per minute against a TDH of 247.54 feet. Refer to Appendix 'C'The pumps are to be equipped with quick disconnect fittings for easy removal from the wet well.

#### 5.4 CONTROL PANEL

The control panel will control pump activation/deactivation. The control logic will be as follows.

- 1. Activate lead pump on rising water level. Elev. = 1518.90
- 2. Activate lag pump on rising water level. Elev. = 1519.50
- Activate flashing alarm light on rising water level. Elev. = 1519.75.
- 4. Deactivated pumps on falling water level. Elev. = 1518.48

The control panel is to be fiberglass NEMA 4X UL listed double door enclosure. The panel is provided total automatic control, as well as individual manual on/off control. The panel is to have flashing alarm light, individual pump run-time meters, power monitor, full voltage non-reversing motor starters, a space heater, and a lighting suppressor. Intrinsically sage relays are to be provided for circuits of all water level sensors in order to prevent spark form occurring at any of the circuits.

The control panel is to be mounted on an electric panel board rack that will also have mounted: and electric source meter, a 460 to 120 volt transformer, 120 volt single breaker box with a main power supply shut off, junction box, a panel board light, light switches, a remote force main

flow rater meter read out, a 12 volt batter charger, a 12 bolt battery to start the back-up generator motor and any other electrical components necessary for a complete/functional duplex pump panel board. The electric panel board rack will have a tilted roof to provide some shade and some rain protection, as well as to provide support for overhead lights.

#### 5.5 VALVE VAULT

Dual discharge piping from the pumps and the wet well will converge in a valve vault. Each pumps' discharge pipe will be equipped with a back flow preventing check valve and an isolation gate valve before, converging into the 4" force main. In the event of a spill within the valve vault, the floor of the vault will have a grate and a drain pipe leading back to the wet well. The roof of the valve vault will have an easy access covers for installation and maintenance access. The redundant pipe and isolation valve will be installed in order to have flexibility in flushing the pipe system, returning pumped fluids to the wet well, or pumping through some other pipe than the 4" force main.

#### 5.6 WASH-DOWN PAD

A 4-inch water tap shall be installed at the site with a Siamese hose connection or fire hydrant required at the end of the water tap. Debris and objects that are retrieved from the routine maintenance of the grit chamber can be rinsed off at the wash-down pad then stored in 50 gallon container until ready for transport to an approved disposal site. The wash-down pad will have a grate feeding a discharge pipe that drains back to the grit chamber. The wash-down pad may also be used by maintenance staff to rinse off the pumps prior to working on them, or washing their hands after coming into contact with wastewater.

#### 5.7 MAGNETIC FLOW METER

An inline magnetic flow meter, within a vault, is proposed for the force main. The meter will have a remote readout mounted on the electric panel board rack.

#### 5.8 AIR/VACUUM RELEASE

A combination air release and air/vacuum release valve and vault is proposed immediately after the valve vault in order to help protect the force main from blockage due to trapped air and collapse due to a vacuum occurring in the force main.

#### 5.9 BACK-UP GENERATOR

The proposed pump station will have an on-site back-up generator with an automatic transfer switch. If the generator is not installed initially with construction of the liftstation, the generator should be installed no later than the occupancy of the 43<sup>rd</sup> dwelling unit in accordance with A.A.C. R18-9-E301.D.5.g. The Back-up generator is to automatically activate via power transfer switching, in the event that normal utility power to the site is disrupted. The Back-up generator is to be capable of operating both pumps and all other electrical components at the site in two stages. A twelve volt (12V) direct current (DC) battery will be connected to the system in order to start the generator upon utility power failure. A battery charger will maintain the battery's charge. Once the utility power is back to normal, power to the pumps and other loads will automatically switch from generator to utility. The pumps' control panel flashing alarm light is to be activated when utility power is disrupted.

#### 6.0 INITIAL OPERATIONS & MAINTENANCE MANUAL

This Initial Operations and Maintenance Manual should only be considered as a guide for developing a Final Operations and Maintenance manual once the pump station and force main are constructed and become operational. The content of the Initial Operations and Maintenance Manual consists of subject matter recommended by A.A.C.R18-9-E301.F.

#### 6.1 STATION LAYOUT & FLOW PATTERNS

- A). Wastewater from Quail Run enters the pump station site through an 8-inch gravity sewer collection system. The wastewater from the gravity sewer collection system will connect to a grit chamber, the pump stations first structure.
- B). The grit chamber is a five foot diameter underground chamber that extends 5 feet below the incoming gravity sewer pipe. Heavy debries and objects in the wastewater will fall to the bottom of the chamber and be trapped there. Large light debris and objects floating will also be trapped in the chamber by a screen that is covering the outlet pipe that leaves the grit chamber. The pipe leaving the grit chamber is at the same elevation below ground as the pipe entering the grit chamber. The pipe leaving the grit chamber is located on the opposite side of the chamber from the pipe entering. The purpose of the grit chamber is mainly to protect the pumps by removing debris and objects that could harm the pumps.
- C). Wastewater leaves the grit chamber and flows to wet well that contains the pumps through a connecting underground gravity flow pipe. This pipe is sloped downward towards the wet well so that the wastewater can flow via the force gravity.
- D). The screened wastewater then enters the wet well containing the pumps. This is the pump station's second structure. The wet well is an eight foot diameter underground chamber that extends 2.77 feet below the inlet pipe. The wet well has two submersible pumps mounted to the floor on the chamber. When the water level in the chamber rises to a certain point. One of the pumps will automatically turn on and begin pumping the wastewater.
- E). the operations of the pumps is controlled by switches in the electrical boxes at an above ground control panel board. The

control panel board also has a flashing warning light in the event the wastewater in the wet well reaches a level indicating pumping problems. The control panel board also has an overhead light for night work, and electrical outlets for plugging in equipment. The panel board is also where main electric power is to be shut off.

- F). The wastewater is next pumped through an 4-inch iron pressure pipe to a valve vault. Each pump has its own 4-inch iron pipe that goes from the pump in the wet well to the valve vault.
- The valve vault is the third underground structure at the site. The G). valve vault is seven foot diameter (round) chamber that extends approximately five feet below the ground surface. The two 4-inch pipes, coming from the two pumps, enter the vault where valves are placed on the pressure pipes. Each 4-inch pipe has a check valve and a gate valve installed on it. The check valves prevent the wastewater from flowing in the wrong direction towards the pumps, which could damage the pumps. The gate valves are to turn flow off completely, from or towards the pumps. The gate valves isolate the pumps so that a pump can be removed for repair or maintenance. The two 4-inch pressure pipes are then both connected to where the force main begins. The valve vault piping has a pipe connection and gate valve for external use. This could be used to pump wastewater to a truck for disposal elsewhere, in the event that the force main was un-operational. It could also be used to recycle water to the wet well during pump testina.
- H). The valve vault also has a four inch plastic drain pipe in the floor of the vault. The drain pipe is connected back to the pumps' wet well. The purpose of the drain pipe is to return any wastewater to the wet well that is spilled in the valve vault, when valves are being replaced thus eliminating the possibility of an external spill.
- for air that is trapped in the force main to be released. Trapped air can reduce the amount of wastewater flow that is trapped in the force main. It also prevents a vacuum from occurring.

in the force main. A vacuum in the force main could collapse the pipe. A vacuum can occur when wastewater flows out of one end of the pipe without having any wastewater or air flowing into the other end of the pipe.

- J). The wastewater then flows in the 4-inch force main to the last underground structure at the site. This structure is also a three foot diameter (round) vault with a gravel bottom. This vault contains a wastewater flow meter. The flow meter is an electromagnetic flow meter that has a digital read out located on the control panel board.
- K). The pump station site has a potable water spigot for use in washing down equipment and motors prior to maintenance work or, washing down trapped debris/objects before transporting the debris/object to an approved disposal site. The water from this spigot is safe for human consumption and may be used for washing dirty hands or for washing out a person's eye in the event of an accident. The water may also be used to initially test the pump system.
- L). The site has a concrete wash down pad that acts as a controlled area for washing down equipment, motors or, debris/objects. The pad has a four inch drain pipe, connecting the pad to the wet well. This pipe allows wash water to be drained to the wet well, then pumped away with the wastewater.
- M). The site will have a back-up electricity generator. The back-up generator is needed in the event that the normal electricity supply is lost.
- N). After the wastewater's flow rate is measured, the wastewater will flow through the 4-inch force main to the grit chamber of the liftstation located at the intersection of Judd Road and Felix Road. The force main will be buried four to five feet below ground. A force main identifying/locating tape will also be buried in the same trench with the pipe at/or about 18 inches below the surface. The 4-inch force main is switched from iron pressure pipe to plastic pressure pipe before leaving the Quail Run pump station site.

#### 6.2 UTILITIES

The site will have potable water, electricity and natural gas. The electricity will be three phase high voltage (460) for operating the pumps. Transformers are used to further step down the voltage for all other equipment. Natural gas can be used to run the back-up generator.

Natural gas can be shut off completely at the gas meter.

Electric power can be shut off completely at the control panel board.

Water can be shut off completely at the water meter.

#### 6.3 OPERATIONS & CONTROL PROCEDURES

The pump station is fully-automatic self-operating facility, requiring periodic operation and control by the station's operator. The station's operator is to make routine inspections of the operations and controls and perform the following:

- A). Check grit chamber for amount of debris/objects trapped. Remove debris/objects from water surface, outlet pipe screen, and chamber bottom as warranted by operating efficiency. Rinse off removed debris/objects at the wash down pad. Store rinsed debris/objects in sealable 50 gallon drums. Record date and type of debris/objects trapped (at least once per emptying). Record any noticeable abnormal odors coming from the wastewater. Record any noticeable abnormal color in the wastewater.
- B). Check electric control panel board for any noticeable damage. Test flashing alarm light by engaging test button. Test yard light by turning switch to 'on' position. When pump is operating, record the flow rate. Check running time meter for each pump to assure equal run time has occurred. Check pumps' on/off/auto switches for correct positioning (auto). Check space heater for proper operation.
- C). Check wet well for any noticeable damage. Check water level sensor for correct height and for tangles in wires. Check piping for noticeable leaks.

- D). Check valve vault for any noticeable damage and leaks in the piping. Check that the pumps discharge pipe gate valves are in the fully open position.
- E). Check air/vacuum release valve vault for any noticeable damage and leaks in the piping.
- F). Check flow meter vault for any noticeable damage and leaks in the piping.
- Check water Siamese hose connection for proper flow and pressure. Make sure water is turned off after use.
- H). Check wash-down pad grate for blockage. Run water through grate and check for proper drainage of pad. Transport debris/objects collected from grit chamber to approved disposal site once storage containers are full. To reduce odors, rinse off debris/objects daily, until transported to disposal site.

### 6.4 SAFETY PROCEDURES

### A). Public Health & Safety

Wastewater pump stations must be treated with caution and respect from a public health and safety standpoint. The possibility of contamination or infection from pathogenic organisms does exist when one comes in contact with wastewater. Breathing in of wastewater fumes can also be toxic, especially in unventilated areas.

The fence around the pump station must be maintained to discourage unauthorized people from entering site.

Wastewater spill need to be presented as best as possible through proper operations and maintenance.

Unavoidable spills need to be contained on-site and cleaned up as fast as possible in order to minimize any risk to public health and safety, as well as to protect the environment. Containment can be achieved by constructing an earthen berm, or erecting a sandbag wall, around the site.

## B). Personal Hygiene

- 1). Never eat lunch or put anything into the mouth without first washing and disinfecting hands with antibacterial soap.
- Keep hands away from face when working on pumps or other parts of the operation where hands may have become contaminated.
- Don't wear work coveralls or rubber boots in the car or at home.
- 4). Always clean any equipment such as safety belts, harness, and face masks, gloves, ect. after use.
- 5). Keep fingernails cut short and clean as they are excellent carriers of dirt and germs.

## C). Safety

- 1.) Remove and replace heavy manhole/chamber covers carefully and only with the proper tools.
- Descend into any manhole/chamber cautiously to guard against defective steps or rungs.
- 3). Only enter well ventilated manholes/chambers. See part regarding noxious gases that bay be found in sewers.
- Maintain a high level of good housekeeping. This involves keeping floors, walls and equipment free from dirt, grease and debris. Keep tool properly stored when not in use.
- 5). Keep concrete surface clean and free from slippery substances, such as oils.
- 6.) Be especially cautious when working with an electrical distribution system and related facilities. Never work on electrical equipment and wire with wet hands or when clothes and shoes are wet. Always wear appropriate safety gloves for electrical work. Never use a switch box for anything other than a switch box.
- Keep all personnel safety conscious by reminding them of specific safety instructions. Such instructions should include information on how to contact the nearest medical center and fire station, rescue techniques, resusitation and first aid techniques.
- 8). Never work alone around the manholes/chambers because of the danger of drowning and other accidents.
- 9,) Refrain from smoking while working in manholes or other areas where gases can be trapped.
- Sufficient fire extinguishers (Underwriter's Laboratories approved) should be placed in readily accessible locations.

- 11) Treat all cuts, skin abrasions and similar injuries promptly.

  When working with wastewater, the smallest cut or scratch is potentially dangerous and should be cleaned and treated immediately with a 2 percent solution of tincture of iodine.
- 12). See a doctor for all injuries.
- 13.) Provide first aid training for all personnel.
- 14.) Be inoculated for waterborne diseases, particularly typhoid and paratyphoid fever. Keep a record of all immunizations in an employee health record to assure yourself of receiving up-to-date boosters, ect.
- 15.) In laboratory work, use pipet bulbs rather than the mouth so as not to introduce contamination to the mouth. Don't drink water from laboratory glassware. Paper cups should be provided in laboratories for drinking purposes. Never prepare food in a laboratory.

## E). Noxious Gases, Explosive Mixtures and Oxygen Deficiency

The principal gas hazards associated with wastewater treatments are accumulations of sewer gas and its mixtures with other gases or air which may cause death or injury through explosion or by asphyxiation as a result of oxygen deficiency. The term sewer gas is generally applied to the mixture of gases in sewers and manholes containing high percentages of carbon dioxide, varying amounts of methane, hydrogen, hydrogen-sulfide and low percentages of oxygen. Such mixtures sometimes accumulate in sewers and manholes where organic matter has been deposited and has undergone decomposition. The actual hazards from sewer gas exit in the explosive amount of methane, hydrogen sulfide or oxygen deficiency. Hydrogen sulfide is toxic at vary low concentrations and one's sensitivity to the odor is quickly deadened.

Chlorine gas, which is irritating to the eyes, respiratory tract and other mucous membranes, may settle in low, still areas. The gas forms an acid in the presence of moisture. The gas escapes by leakage from cylinders and feed lines and finds its way to these places.

# F). Safety Equipment

The types of safety equipment which a wastewater facility should have are as follows:

- 1). Detection equipment (for gases and oxygen deficiencies).
- 2). Masks (self-contained air packs for oxygen deficiencies).
- 3). Safety harnesses, lines and hoists.

- 4). Proper protective clothing, gloves, footwear and head gear.
- 5). Ventilating equipment.
- 6). Non-sparking tools.
- 7). Communications equipment.
- 8). Portable air blower.
- 9). Explosion-proof lantern and other safe illumination.
- 10). Warning signs and barriers.
- 11). Emergency first aid kits
- 12). Proper fire extinguishers.
- 13). Eye wash and shower stations in laboratory areas.
- Safety goggles for work in laboratories and other dangerous areas.

#### G). Additional Source of Information

New York Manual, Ch. 14 WPCF, MOP No. I, Safety in Wastewater Works Texas Manual, Ch. 35 Sacramento State Home-Study Course, Ch. 12

#### 6.5 MAINTENANCE

## A). Maintenance Tools/ Equipment (to be readily available)

- 1). Extra long garden rake, to clean grit chamber's grate, at discharge pipe to wet well.
- 2). Grappling hook with rope, to fetch floating debris/objects in the grit chamber.
- 3). Extra long ladder, to enter grit chamber and wet well, for special maintenance.
- 4). Portable air blower/fan, to vent grit chamber and wet well, before/during entering.
- 5). Winch or hoist (with necessary appurtenances), to remove pumps.
- 6). Water hose (with nozzle), to wash down equipment and area.
- 7). Telephone, to call for assistance.
- 8). Locks (combination or with keys), to lock access doors to chambers and wet wells.
- 9). Broom and dust pan, to collect small debris/objects at wash down pad.
- 10). 50 gallon drums (with sealable lids), to store and transport collected debris/objects.

- 11). Safety equipment.
- 12). Extra light bulbs

### B). Station's Equipment (General)

Refer to manufacturer's equipment brochures for component equipment maintenance procedures.

#### C). Gate Valves:

All valves should be operated periodically to ensure proper operation and prevent "freeze-up". Do not close gate valve on pipe that is in use.

#### D). Grit Chamber:

The grit chamber shall be checked regularly (weekly). The grit level is to be noted. Periodic cleaning (grit removal) will be required to prevent grit buildup and entrance of grit to the wet well. Grit shall not be allowed to accumulate to a level higher than 12 inches below the bottom of the discharge pipe to the wet well. The utility is to contract with a local waste hauler of grit removal, and safe disposal at an approved site.

## E). Sewage Combination Air Release and Air/Vacuum Valves

Combination air release and air/vacuum valves shall be visually inspected and the exhaust ball valves tested on a regular (monthly) basis to ensure proper operating conditions. If leakage is noted coming from any part of the unit, the unit is to be repaired in accordance with the manufactures' recommendations or replaced.

## F). Flashing Alarm Light:

Test the alarm light daily by pushing the test button on control panel.

## G). Wet well Liquid Level Sensors:

Test all sensors on a regular basis (monthly). Lower or raise each sensor as needed to the existing liquid level and determine if proper reaction from the pumps and the alarm light occurs.

### H). Wet Well Liquid Level Sensors:

Replace any damaged/leaking pipe. Tighten bolts or replace leaking fittings. This should be done as soon as a leak is observed.

### Electrical Equipment, Switches and Conductors:

Annually, a certified electrician is to inspect/ test all electrical components and wiring. Replace all components and /or wiring that is likely to fail during the next year of service.

### J). Generator:

See manufacturer's maintenance recommendations in Volume 2.

#### 6.6 RECORDS

The pump station's operator and maintenance staff are to keep records of the pump station operations (flow rates, emergencies, utility cost, ect.,) and of the equipment replacements, repairs and maintenance.

### 6.7 TROUBLE SHOOTING

## A). Equipment Troubleshooting:

The final Operations and Maintenance Manual is to have a section which contains troubleshooting recommendations from each equipment manufacturer that has equipment installed at the pump station site.

#### B). Operations Troubleshooting:

### Flashing Alarm Light Activated

The flashing alarm light will be activated when the flow rate of wastewater entering the pump station wet well exceeds the rate of flow that the two pumps can pump out of the wet well. The alarm light will also be activated where there is a power failure. Following are potential causes for the flashing alarm light to be activated.

## a). Pump(s) failure

The alarm signal can mean that one or both pumps might have failed. First check control panel to make sure pumps switches are at the "AUTO" position. Test pumps to see if they are functioning properly. Replace one or both pumps if a pump(s) have actually failed.

## b). Pump(s) RPM to low

If the pumps have variable speed drives, as recommended, the problem can most likely be cured by increasing the rpm of the pumps.

## c). Force Main Blockage

If a blockage occurs in the force main leaving the pump station, flow will be restricted or blocked and wastewater will rise in the wet well activating the flashing alarm light. Test each pump(s) operational status by hooking a hose to the by-pass connection in the valve vault and return pumped wastewater to the wet well. If no flow goes through the by-pass, a force main blockage is most likely. The blockage could be due to trapped air in the line. Check combination air release/air vacuum valve for proper operation. If ok, next flush the force main by pumping clean water at high pressure through the by-pass connection. Remember to close isolation valves to the pumps before flushing operations. If flushing does not clear the blockage, use a sewer rooter or sewer roadrunner to free the obstruction.

## d), Isolation Valve(s) Closed

If a pump's isolation gate valve is closed or partially closed, the flow rate leaving the wet well will be stopped or reduced respectively. Check that valve(s) in valve vault are fully open, except by-pass valve which should be fully closed.

e). Pump(s) Check Valve Malfunctioning or Clogged

If a pump's check valve collects debris, it can malfunction or become clogged. Once it has been determined that

- 1). the pump(s) are operating properly,
- 2). that the isolation valve is fully open and
- the force main does not have a blockage; then it is time to remove and inspect the check valve(s) and possibly the isolation valve(s). Replace valves if needed.
- f). Wet well Liquid Level sensor(s)/Pump(s) Activation Switch (es) Failed or Hung Up

If a liquid level sensor(s) fails or gets hung up on other equipment in the wet well, the pump(s) might not activate and deactivate as they are suppose to. Remove sensor(s) and check to see that they are working properly.

g). Control Panel Malfunction

If a pump(s) will not automatically activate and deactivate, the liquid level sensor(s) are working properly, an electrical malfunction in the control panel is most likely. Call a professional electrician to check out the circuitry.

Grit Chamber Overflows

If the grit chamber's discharge pipe screen becomes clogged, the grit chamber will fill with wastewater and overflow (spill) to the surrounding area. Immediately clean the screen and grit chamber of all trapped debris.

6.8 EMERGENCY OPERATING PLANS & PROCEDURES

Emergency conditions are situations which pose immediate hazards to (1) personnel; 2) environment or 3) equipment. To ensure that station's operation goes on with minimal disruption, emergency situations must be identified and contingency plans detailing special procedures be

established for alternate methods of operations, emergency repair, first aid, and other emergency responses before such a situation arises.

Once developed, the emergency operation and response program must be annually reviewed and updated. The objectives of emergency response planning are identified as follows:

- 1). To eliminate or minimize adverse effects from emergency situation affecting the pump station.
- 2). To develop procedures for properly responding to emergencies.
- To provide instruction for system personnel to ensure that they understand their responsibilities during emergency situations.
- To provide inventories of available emergency equipment and supplies and outline existing mutual aid agreements/contracts with outside organizations for specialized assistance.

Telephone numbers of persons to contact under different emergency conditions are to be kept in an accessible location.

## A. Causes of Emergencies:

There are five major causes of emergencies.

- 1). Natural Disasters
- 2). Civil Disorders and Strikes
- 3). Faulty Maintenance
- 4). Negligent Operation
- 5). Accidents

#### 1. Natural Disasters

Each individual treatment facility is subject to certain specific disasters. In Pinal County, primary natural threats are floods, tornadoes or windstorms, earthquakes, fire, explosions, and freezing. A response plan for all of these situations should be predetermined. The possible effects of each disaster should be listed along with the immediate precautions to be taken which will either eliminate or counteract each effect. The following list a suggested response procedure for the most commonly suffered effects. This table should be expanded by the operator so

that it provides an up-to-date reference for all plant personnel.

#### a). Floods

There are two (potentials for flooding: The first potential is from natural causes, such as rainstorms or the overflowing of rivers and washes. The other potential is a pump station operational causes: i.e., when incoming wastewater cannot be contained and pumped to its proper discharge point due to such reasons as piping failure, pipe blockage, pump or equipment failure, power failure, or failure of personnel to exercise proper maintenance or operational practices. Regardless of the cause, flooding is a health and safety hazard for people and environment.

Flooding may occur either inside or outside the facilities. The areas prone to flooding are manholes, chambers, the wet well and any low lying areas of site.

Storm water flooding usually will not pose a health hazard at the pump stations unless the storm water is allowed to enter manholes, the grit chamber and/or the wet well at a rate in excess of the pump station's capacity for pumping capacity, local flooding by sewage contaminated storm water will occur as the manholes, grit chamber and wet well fill up and overflow to the surface runoff waters. Infiltration is minimized by constructing the access points to the manholes, the grit chamber and the wet well at an elevation above the water surface elevation of the flooding storm waters and by keeping the access lids/covers closed.

Flooding caused by the overflow of wastewater due to operational causes will pose people and the environment to all hazards of waterborne diseases and may lead to the production of areas/pockets of toxic and/or explosive gases/vapors, and possibly oxygen deficient areas. Wastewater overflow flooding due to operational causes should be

avoided at all costs through proper operation and maintenance of station.

Any flooding that inundates electrical equipment could cause electric shock hazards and could damage certain electrical components.

In the event of flooding with wastewater involved, health and safety considerations should include the following:

- have provisions in place for a local waste hauler to be available for service in emergencies.
- 2). Notify all appropriate authorities (police, health and fire).
- 3). Do not enter flooded areas alone
- Do not enter flooded areas prior to shutting off electrical current to any submerged electrical lines or equipment that ate not rated for submerged use.
- 5). Do not enter flooded area prior to checking for gas presence and oxygen deficiency.
- Do not enter flooded areas without proper protective clothing and equipment.
- 7). Berm or sand bag the perimeter of the pump station site to contain the contaminated waters.
- 8). Have standby portable wastewater pumps and air blowers/fans available.
- Do not use unprotected lights or other unprotected electrical equipment during clean up procedures.
- Special consideration should be given to the prevention of possible contamination of the potable water supply.
- 11). Perform site cleanup per approved cleanup plan.

The pump station operator is to see that advanced preparations are in place for reacting to a flood with wastewater involved scenario at the site.

### b). Tornados or Windstorms

Occasionally tornados, windstorms or other wind disturbances can occur in Pinal County. When advanced warning is given, all moveable objects should be secured and all emergency equipment made ready. Power failure and flooding may accompany tornadoes or windstorms and preparations should be made anticipating their occurrence.

Some of the damages which might be considered would include the following; access hatches blown off, possible damage to any exposed equipment, and the accumulation of debris. Especially troublesome may be large amount of debris entering the grit chamber with the influent wastewater flow, causing an abnormal load on the discharge pipe screen.

## c). Earthquakes

Pinal County does not have a history of damaging earthquakes. However, if one should occur, possible hazards would include power outage, flooding from operational causes. In the case of a severe earthquake, there could be pipe ruptures, structural damage, fires and explosions.

### d). Eires

The most important factor in the prevention of the majority of fires is practicing a high standard of good housekeeping. The routine removal of paper, flammable dust, oily wastes, ect., will minimize the possibility of fire by removing the source of fuel. Keeping the site free of unwanted vegetation (weeds) is required.

A fire prevention program by and for all employees is to be in place. "No Smoking" signs, posted where applicable, will help to eliminate a source of ignition. Carelessness is the main source of ignition and it is the responsibility of the Utility to instruct employees in the fundamental objectives of fire prevention. These objectives include:

- 1). Good housekeeping practices
- Recognition of potential explosion hazards.
- Careful observance of maintenance procedures such as spray painting, welding, burning and soldering.
- 4). Smoking only in authorized areas.
- 5). Proper operation of equipment and processes.
- Proper preventive maintenance for all electrical and mechanical equipment.
- 7). Do not allow unqualified persons to work in hazardous area.

The majority of industrial fires originate in wiring and electrical equipment. Other causes include smoking, friction, overheating materials, burners, sparks, spontaneous combustion, burning or welding, chemical action, and lightning.

The pump station operator is to develop a fire plan in conjunction with the local fire department. In case of fire; (1) evacuate non- essential personnel, (2) call fire department and (3) try to combat fire with available trained personnel and equipment. Fire extinguishers are to be readily available.

Care must be taken to combat fires with the appropriate equipment, i.e., do not use water on electrical or oil fires, as this will only compound the problem.

### e). Explosions

Explosions can occur when certain dust gases, explosive liquids or explosive vapors have accumulated and are trapped.

Explosive gases include methane, sewer gas, hydrogen sulfide, ethane, ammonia, natural gas and carbon monoxide. Locations where these gases can accumulate and be trapped are in sewer manholes, sewer pipes, chambers and wet well. Potential for natural gas infiltration into the wastewater collection system does exist and special precautions are to be taken.

Explosive liquids and explosive vapors, incorporates such items as gasoline, cleaning solvents (such as carbon tetrachloride), paints and oils. All of these have explosive vapors associated with them. Hazardous areas would include any enclosed areas such as manholes, chambers or wet well when adequate ventilation is not present. Sources of explosive substance can occur during construction of the pump station or during its maintenance. Another source of these material is created when the local fire department hoses down gasoline spillage (as from overturned vehicles, ect.,) into the sewer system, or accidental spillage from gasoline storage and filling stations. Homes and businesses might also discharge oils, grease, volatile solvents or other materials into the sewer system, which can generate explosive vapors in addition to being combustible in liquid form.

Preventive measures consist of using explosion-proof or intrinsically safe electrical equipment, providing adequate ventilation, removing dust by vacuum cleaning, restricting open flames and smoking, providing good preventive maintenance, using gas detection equipment, and maintaining general good housekeeping.

Explosions, if they occur, may be accompanied by fire, power outage and possible flooding from

operational cause. In the event that gases or other explosive materials are present, shut down all electrical equipment to eliminate the source of ignition until the area can be properly ventilated.

### f). Freezing

The location of the pump station is in an area where freezing rarely occurs for extended periods of time. Therefore, only routine safety measures, which include the removal of snow and ice from areas where people might walk and slip, are necessary when freezing occurs.

#### 2. Civil Disorders and Strikes

Civil disorders and strikes present a new type of threat to the nation's water pollution control program. During a time of civil disaster, many situations could occur which would prevent efficient operations of the pump station. An emergency response plan should include steps to be taken to prevent equipment damage and to ensure rapid recovery of full pumping capability. Some of the possible situations that could occur during a strike or civil disorder are destruction of wastewater pumping station, the bombing of a power substation, or the dumping of toxic material into a sewer manhole. When the response plans to disaster situations are organized, emergencies such as the ones listed above should be considered.

#### 3. Faulty Maintenance

Faulty maintenance can cause breakdown throughout the system. If the breakdown is a major unit, an emergency situation could exist. Therefore, as part of the emergency response program, a plan should be established to ensure against faulty maintenance; and, if a breakdown does occur, an efficient repair procedure should be organized.

### 4. Negligent Operation

Negligent operation can be a major cause of pump station emergencies. Careful, organized operating procedures must be established in order to protect employees, the surrounding community and the environment. As an extra precaution, it is also wise to set up a system of checks and balances so that one person is never solely responsible for the operation of the pumping station.

### 5. Accidents

As emphasized throughout this document, safety should be one of the primary concerns of the Utility's staff. The main way to reduce accidents is to observe all safety regulations faithfully. Accidents, when they do occur, result in personal injury, property damage, or environmental pollution. Accidents, more than any other type of emergency, require a quick, logical response. Therefore, it is important to keep lists posted at the EMERGENCY CONTROL CENTER which explain the response actions, in order of importance, for each type of emergency that might result from a personnel, equipment, or natural accident.

### B. Effects of Emergencies

The reason for the pump station and force main is to protect the public's health and the environment by first containing and then pumping wastewater to a point of discharge. When the potential arises that the wastewater will not be contained and /or pumped to a point of discharge, an emergency exists. The potential causes for an emergency can have many effects rift: on the pump station and force main, yet many causes will have the same effect. It is important to remember when preparing an Emergency Operation and Response Program that there is a certain limited number of critical effects that stem from the many causes of emergencies. In order to avoid repetition in a response program, it is more logical to establish a response procedure for each critical effect rather than for each of the many causes. The critical effect then becomes the emergency and can be suspended to no matter what the cause. However, the cause(s) might also require a response in order to eliminate the effect/ermergency. The Emergency Operation and Response program should be simplified by addressing what response(s) to take in order to prevent or minimize the critical effect by carefully analyzing the situation then responding.

Critical effect that should be considered are as follows:

- 1). accidental Injuries
- 2). Communication Loss
- 3). Power Outages
- 4). Pump Station Malfunctions
- 5). Wastewater Spills
- 6). Fires and / or explosions
- 7). Operations and Maintenance Personnel Absence

Each of these critical effects (emergencies) may have several potential causes that need to be analyzed and possibly corrected, in order to prevent a risk to the public's health & safety as well as protect the environment. Some critical effects (emergencies) may be or become the cause for another critical effect (emergency)

## C. Emergency Control Center

Once constructed the operator building at the Johnson Utilities Section 11 WWTP will be the EMERGENCY CONTROL CENTER (ECC). The ECC should contain a mobile telephone, a list of reserve equipment and supplies and their location, standby generator data and emergency response procedures' check list for the most probable emergencies. Special notices or instruction should also be posted at this center.

An alternate emergency control center should also be considered.

## D. Vulnerability Analysis

It is important that the pump station controls the equipment, which would be the most vulnerable during an emergency, be pinpointed so that the consideration can be given to the alternate or emergency modes of operation available. One way to isolate vulnerable processes and/or equipment is through a "vulnerability analysis". This is done by selecting several high-risk emergency situations and estimating the effects that each of these situations could have on individual components of the pump station. The components that would be out of service during several type emergencies, and are vital to the operations of the system are the most vulnerable system components. The list of vulnerable system components should be compared with the repair priority list. Single out vulnerable components which are high on the repair

priority lists. Special attention should then be given to the maintenance, repair, and emergency operation of these components.

The following measures are considered to reduce component and system vulnerability:

- The formation and execution of the optimum preventive maintenance and equipment testing program.
- Complete familiarization with the alternate modes of system operation that would allow a more vulnerable component to be taken out of service.
- Maintenance if reserve and emergency equipment (both for operations and/or repairs) in good working order along with all the tools and equipment necessary for placing the reserve or emergency equipment into operation.
- 4). Training regular and auxiliary personnel in emergency operations and procedures.
- 5). Conducting emergency operations exercise periodically.

# E. Role of Utility's Personnel in Response Program

Initially, utility personnel should work together to perform a vulnerability analyses for the pump station and to create checklists for the procedures to be followed in all anticipated emergencies. Steps should then be taken to equip the EMERGENCY CONTROL CENTER, stock and inventory reserve supplies and spare parts, and inform all employees of basic emergency procedures. It is important in the beginning that it be clear exactly who will give orders in case of an emergency so that the response program will run as smoothly as possible.

Accurate record keeping is also important to a well organized response program. When an emergency occurs, there should be up-to date plans of the pump station so that repair teams can locate the problem area. Inventory should be restocked as soon as possible so that reserve supplies will be on hand when needed.

Once an emergency response program has been set up, it is important that it be ready to go into action at a moment's notice. Therefore, a schedule should be established which will give certain

prescribed times when reserve equipment will be tested and reserve supplies inventoried.

Utility's employees should be drilled periodically on emergency response procedures. During emergency drills, all personnel should report to their posts and proceed as they would in an actual emergency. Those aspects of the plan that require the cooperation of other organizations should also be reviewed periodically with key personnel from these organizations, particularly after emergency plan updates.

## F. Emergency Early Warning Report

The operators, mechanics and supervisory staff should devise an Emergency Early Warning Report, a system for notification of organizations and agencies who might be affected by an impending emergency or spill. If this report is to be effective in initiating response action it must state, clearly and concisely, the possible emergency, evaluate its possible effects and indicated, if possible, what the disruption to the pump station might be. All possible threats to public health, water system, and other public services should be listed and taken into consideration. The degree of emergency and action needed should be categorized as minor, moderate or major and appropriate response action should be carefully detailed. Copies of the report and instructions for its use should be given to concerned organizations, to involved agencies and to those who are most apt to become aware of possible emergency condition.

## G. Operation and Equipment Failures Procedures

#### General

It is important to remember when developing the response plan for operation and equipment failures that a priority system must be established. This priority system should be based on vulnerability analysis. In a system, certain units are more easily dispensed with than others. In major breakdowns, where more that one unit fails, it should be very clear as to which units are to be repaired first.

The first step in any emergency is to obtain the essential facts, analyze the specific situation, and determine the most effective course of action.

2. Collection System Break or Blockage

A significant reduction of influent could indicate collection system breakdown. Collection system maintenance personnel should be notified immediately. A break or blockage in any of the collection lines leading to the pump station is considered an emergency situation. The following steps should be included in those taken to cope with this situation.

- 3. Pump Station Equipment Failures
  - a). Obtain the essential facts, analyze the specific situation, and determine the most effective course of action.
    - 1). Determine if back-up electricity generation is needed.
    - 2). Determine if spill containment is needed.
    - 3). Determine if night lights are needed.
    - Determine if blower/fan is needed for ventilation
    - 5). Determine if electrician is needed.
    - 6). Determine if a by-pass pump and hoses are needed.
    - 7). Determine if fire fighting equipment is needed
    - 8). Determine if traffic control is needed.
    - 9). Determine if special equipment/tools are needed for repair and/or clean-up.
    - 10). Determine what safety equipment is needed for the work crew.
  - b) Implement notification measures as required, particularly public agencies and/or parties under mutual aid agreements. Contracts.
    - Notify Police and Fire Department if deemed necessary.
    - 2). Notify Health Department if deemed necessary.
    - 3). Call for electrician if deemed necessary
    - 4). Call waste hauler if deemed necessary
    - 5). Call for work crew.

- 6). Notify Utility's management.
- c) Check spare parts and equipment inventory.
  - 1). Verify spare equipment/parts are in inventory.
  - Verify needed work equipment/tools are readily available and are operational.
  - Call for emergency back-up equipment/tools.
     Parts not in inventory or not operating.
- d). Dispatch a pre-trained, properly equipped work crew
  - Be prepared to cope with current traffic conditions
  - 2). Be prepared to work at night
  - 3). Be prepared to work under hazardous/flooded conditions.
  - Be prepared to provide adequate ventilation in the work area.
  - 5). Be prepared to contain a spill and protect the environment.
  - 6). Be prepared to treat a spill with lime
  - 7). Be prepared for by-pass pumping.
  - 8). Be prepared to unclog blocked pipes
  - 9). Be prepared to fight fire
  - 10). Be prepared to change out failed equipment
  - 11). Be prepared to cope with wastewater backup into homes, and Buildings.
- e). Restore operations to normal as rapidly as possible.
- f). Always clean up the area as the last procedure. Remember, any hazardous waste must be disposed of properly.

If equipment is frequently checked for serviceability and lubricated and maintained according to the manufacturer's recommendations, equipment breakdowns should be infrequent. When a breakdown does occur, the unit should be isolated and by-passed, and if available, the disabled unit should be isolated from the system and repair work completed as soon as possible. The emergency

response plan for each process should address operational procedures which can best maintain process integrify during equipment malfunctions. Reference should be made to manufacturer's service manuals. All personnel should be alert for conditions that could indicate a failure of equipment, such as equipment not operating, abnormal operations, abnormally high or low liquid levels, ect.

## 4. Force Main Break or Blockage

- a). Ruptures are classified as a spill and need to be fixed as soon as possible to protect the public's health and safety and the environment. The spill will need to be contained and the area cleaned up after the pipe has been repaired. Time will be of the essence, since the pump station will be unable to pump during the repair work, and the sewer system feeding the pump station will begin backing up with wastewater, and possibly flood homes & businesses and/or spill out of manhole covers.
- b). Blockages can usually be prevented by the periodic flushing of the force main with clear water. If a blockage does occur, flushing the line using a water truck with a high pressure head pump will usually free the blockage. The blockage might be cleared by use of a power sewer rooter/rod runner, if the blockage is within the reach of this type of pipe cleaning equipment and power is available. Gas operated sewer rooters and rod runners are also available. Two-way force main cleanouts are part of the force main system. Prior to removing the cap from a cleanout, the pressure in the line needs to be released. This may be done at the pump station or the closest combination air release/ air vacuum valve. Provisions will need to be made to contain released sewage when releasing pressure.

# H. Other Emergency Considerations:

### 1. Contamination of Potable Water

The wastewater entering the pump station is most likely contaminated with organisms dangerous to the public health. Therefore, it is of utmost importance that any nearby potable water supply not be contaminated by a spill and /or flooding. Although it is unlikely under ordinary circumstances, if there is any reason to suspect potential contamination of the potable water supply, the gate valve, located where the water main enters the plant in question, should be closed. The source of the possible contamination should be closed. The source of the possible contamination should be investigated and prevented.

Under emergency conditions such as floods, hurricanes or windstorms, earthquakes, fires, explosion, or excessive cold, extra precautions are required to prevent contamination of the potable water system.

#### 2. Personnel Absence

There are many causes of personnel absence. Some of the major ones are accidents, epidemics, sickness, personal leave, vacations, holidays and weather conditions. To ensure that the plant does not have to operate understaffed, substitute or reserve operators should be on 24-hours call. Also, the Utility's full time operations and maintenance staff members should be trained to handle more than one job so that they can fill in when necessary. Vacations should be scheduled to alleviate personnel shortages as much as possible. Some reserve operators could be recruited from the neighboring communities or utilities. In order for the operator to be aware of the staff and operating needs of neighboring communities or utilities, and whether they would be available in an emergency, mutual aid agreements should be established whenever practical.

### 3. Personal Injuries or Illness

A number of designated people on the operations and maintenance staff should receive first aid, artificial respiration instructions and assist in providing periodic training to all other personnel. The operating and maintenance personnel are to report all injuries to their supervisor. The injuries should be recorded in a logbook. The information should include time of accident, locations,

alleged causes, person(s) involved, and action taken. See Red Cross First Aid Manual for detailed instructions.

In the event of an injury occurring, the basic principles of first aid apply:

- a). Give only the urgently necessary first aid suggested in the Red Cross Manual.
- b). Have the victim lie down.
- c). Check for injuries
- d). Plan what to do.
- e). Carry out the indicated procedures.

Act quickly as each second of delay may be critically important. The following order for treatment response is suggested:

- a). Sever bleeding,
- b). Stoppage if breathing, when artificial respiration should help.
- c). Poisoning. The proper first aid should be administered by personnel trained in first aid procedures. While the first aider's time and attention are devoted to the patient, someone else should go or call for a physician.

Illness of plant personnel, including diarrhea disorders and possible virus infections of eyes, nose, and throat, should also be reported and recorded. This procedure is important even if the illness does not appear to be directly attributable to working conditions at the time of occurrence.

#### Power Loss

If a power failure occurs at any time, it will stop the pump station operation. Always have flashlight available at night. If interruption is more than a momentary interruption, proceed as follows:

> a). Check with power company to determine, if possible, the probable time of service resumption.

- b). Activate stand-by generator if it does not have an automatic transfer switch.
- c). Transport a portable generator to the station, if station does not have a permanent stand-by generator.

Once electric company power is available. Deactivate stand-by power and check electrical equipment, and motors for proper functioning in accordance to the manufacturer's recommendations.

## 5. Spills

Immediately telephone the Arizona Department of Environmental Quality (ADEQ) and be prepared to give the following information:

- a). Type of spill
- b). Procedures being implemented to minimize harmful effects of the spill
- c). Any assistance required to help contain the spill.
- d). Any immediate danger to public health.
- e). Location of spill

A report containing the following information is to be sent to ADEQ:

- a). Cause of spill.
- b). Description of discharge.
- c). Any assistance required to help contain the spill.
- d). Duration of spill, if already corrected.
- e). Steps taken to prevent such a spill from occurring again or plans which will be implemented within a stated period to prevent such a condition from reoccurring.

# Ruptures and Stoppages

Ruptures of pipes may be caused by natural causes such as earthquakes, structural failure, ect. the section of pipe involved should be closed off at the nearest valve in both directions from the break, and the ruptured section removed and replaced. In many cases the flow can be rerouted without serious effects on the wastewater system. Piping plans and schematics should be consulted for alternate methods of operation. Stoppage may be caused by solids build up or solid objects lodging somewhere in the piping system. The plugged section can be cleared while rerouting the flow through another pipeline. Good preventive maintenance (periodic flushing) will aid in preventing a build up of solids.

Repairs should be done as quickly as possible; however, all safety precautions should be carefully observed. Caution should be used when unplugging stoppages as hazardous gases may be released when the stoppage is cleared.

## 7. Helpful Agencies

## a). Fire Department

Cares should be taken to maintain good relations with the Fire Department. They should be asked to make a check of the pump station every six (6) months to guard against potential fire hazards. Members of the fire department could be called upon to act as substitute operators during emergency situation. Explore the possibilities of establishing a mutual aid agreement with them.

### b). Police Department

Make arrangements with the Pinal County Sheriffs
Department to patrol the perimeter of the pump
station periodically, especially during evening hours,
to guard against possible sabotage or vandalism.
Keep the telephone number of the police
department posted conspicuously for an emergency
reference.

## c). Contractors and Repair Agencies

To guard against prolonged major equipment breakdown, make a listing of agencies that will provide 24-hour service.

8. <u>Mutual Aid Agreements with Adjacent Communities and Private Companies.</u>

Many nearby agencies and businesses employ personnel or offer service that can be very helpful during emergencies. Written mutual agreements to help during emergencies should be made with these agencies and businesses. Some examples of groups with whom mutual aid agreements should be developed are as follows:

- a). Nearby water and wastewater utilities.
- b), Industrial firms.
- c). Construction companies
- d). Electric, gas, and telephone utilities.
- e). Fire and police departments.
- f). Civil defense organizations.
- g). Health departments
- h). Rescue sauads

Mutual assistance programs with the above organizations can provide the following:

- a). Emergency equipment and supplies.
- b). Spare parts.
- c). Specialized maintenance skills.
- d). Auxiliary operating personnel.
- e). chemists and/ or sanitary engineers.
- f). Medical assistance.

#### 9. Physician

All questions regarding bodily infections should be directed to the Utility's designated physician. Workers who come in contact with wastewater or sludges could be exposed to waterborne diseases such as typhoid, amoebic dysentery, infectious hepatitis, and many others. Tetanus and skin infection from cuts and chemical attack, and eye, ear, nose, and throat infections from aerosol borne pathogens are also possible.

Barrier creams which protect hands from chemical burn are available at a minimal cost and are quite effective.

Typhoid and tetanus inoculations are often used. For protection against tetanus, a series of two injections of tetanus toxiod (one month apart) should be given and repeated every three years. An adequate inoculation program to protect the employees must be developed by the physician.

If an employee becomes ill, his weekly time report should list the ailment, the time is suffered, and the attending physician, if any.

### 10. Emergency Telephone List:

A list of emergency telephone numbers is to be developed in case of any emergency which requires contacting the agencies and/or individuals listed. Following is a list of numbers to begin with.

Johnson Utilities Inc.	480-998-3300
National Response Center	800-424-8802
ADEQ Hotline	800-234-5677
ADEQ	602-207-4513
APS Power	520-421-8400
Pinal County Sheriff	800-352-3796
Rural Metro Fire First Ald	911

### 6.9 FINAL OPERATIONS & MAINTENANCE MANUAL

A final operations and maintenance manual is to be developed as soon as the pump station is constructed and is operational. Once the final operations and maintenance manual is developed, it is to be continuously updated as long as the pump station is in operation. The final manual is to be well organized for easy retrieval of information and procedures. Superfluous information, materials and procedures should be edited out.

#### 6.10 PROPOSED LIFT STATION EQUIPMENT DATA

Hydromatic S4LRC Non-clog, 3450 RPM, 50 HP,

Submersible Pump Metal to Metal Guide Rail, Wet Well Access Cover. Concrete Sealants Conceal CS-IOI Concrete Joint Sealant Thunderbird Link-Seal Pipe/Wall Sealer ITT Flight ENM-10 Liquid Level Sensor, Grit Chamber & Valve Vault Access Covers, & Cable Holders Waterman PF-25W Cast Iron Flap Gate Valve American Flow Control 50-SC Swing Check Valve Val-Matic 80IBW Sewage Combination Air Release & AirNacuum Valve American Flow Control 50 - Line Double Disc Gate Valve McCrometer Mx Magmeter Electromagnetic Flow Meter U S Pipe Ductile Iron Pipe & Fittings P W Pipe C900 PVC Pipe EBAA Iron Sales Pipe Joint Restraints Smith-Blair Steel Couplings Onan 65GGHB Back-up Generator Set Onan OTIII Automatic Transfer Switch Smith Blair 981 or Ebba Iron 1000 Pipe Joint Restraints for Mechanical Smith Blair 982 or Ebba Iron 1100 Pipe Joint Restraints for Bell and Spigot Joints.

## 6.11 POTENTIAL MAINTENANCE EQUIPMENT

Them Lift Station Pump Hoist Pipe Cleaning Equipment Aries Sewer Television Inspection Equipment Miscellaneous Sewer Tools.

#### 7.0 REFERENCES

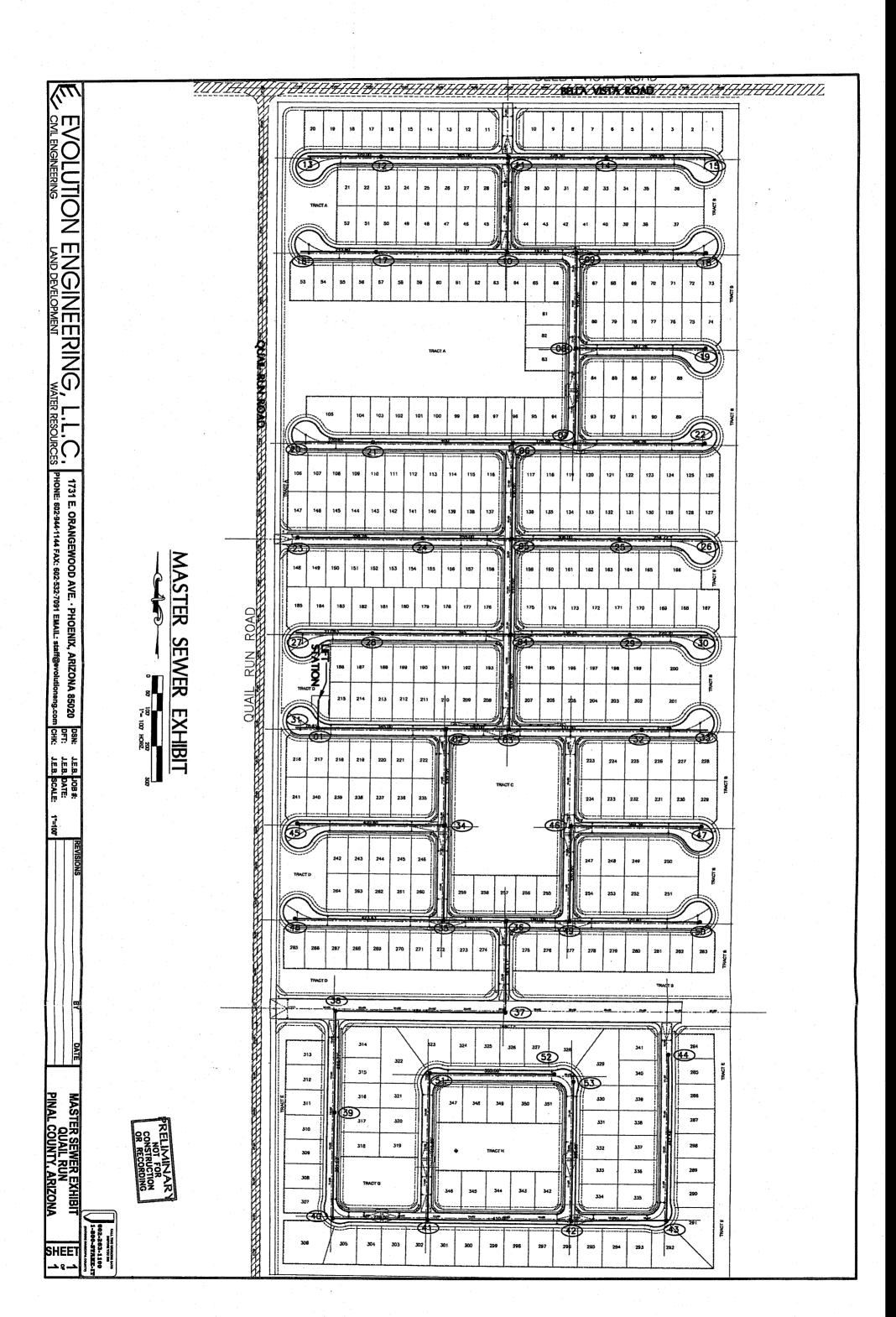
- Johnson Utilities Company Design Guide and Standard Details May 2003.
- Arizona Department of Environmental Quality, Bulletin No. 11, Minimum requirements for design, submittal of plans & specs of sewage works.
- Arizona Administrative Code, Title 18, Chapter 9, Section E-301
- Johnson Utilities, Heritage Road/Felix Road Wastewater Pump Station & Force Main Design Concept Report & Initial Operations & Maintenance Manual, March 2002, Can-Am Engineering.
- Maricopa Association of Governments (M.A.G.) Standards, Arizona, 1998 includes revisions through 2004.

#### 8.0 SUMMARY

The proposed pipe and manhole locations are shown on the proposed sewer layout for Quail Run (Appendix 'A'). The gravity collection system will adequately convey the wastewater collected by the study area to the proposed liftstation located near Tract D. The wastewater flows will then be pumped by the liftstation through a 4-inch force main to the grit chamber of another lift station located near the intersection of Judd Road and Felix Road in the Southeast corner of Section 19. More particularly, the force main alignment will run south along Quail Run Road from the Quail Run development to Judd Road. It will then go east along Judd Road to the Northwest corner of the intersection Felix and Judd Roads where it will discharge into the existing grit chamber designed by Canam Engineering. Refer to the Heritage Road & Felix Road Wastewater Pump Station & Force Main Design Report prepared by Can-am engineering dated March 2002.

When constructed in accordance with this report, Johnson Utilities design standards, and A.D.E.Q. requirements, the system described by this study will serve the wastewater needs of the Quail Run development.

APPENDIX A



APPENDIX B

P:\QUAIL RUN\imp\Master Sewer\Master Sewer Worksheet.xls

Project: Date: Designer:

Quail Run 12/21/2004 J. Bishop

90 GPCD

Population Density for Single Family Development: Average Daily Flow:

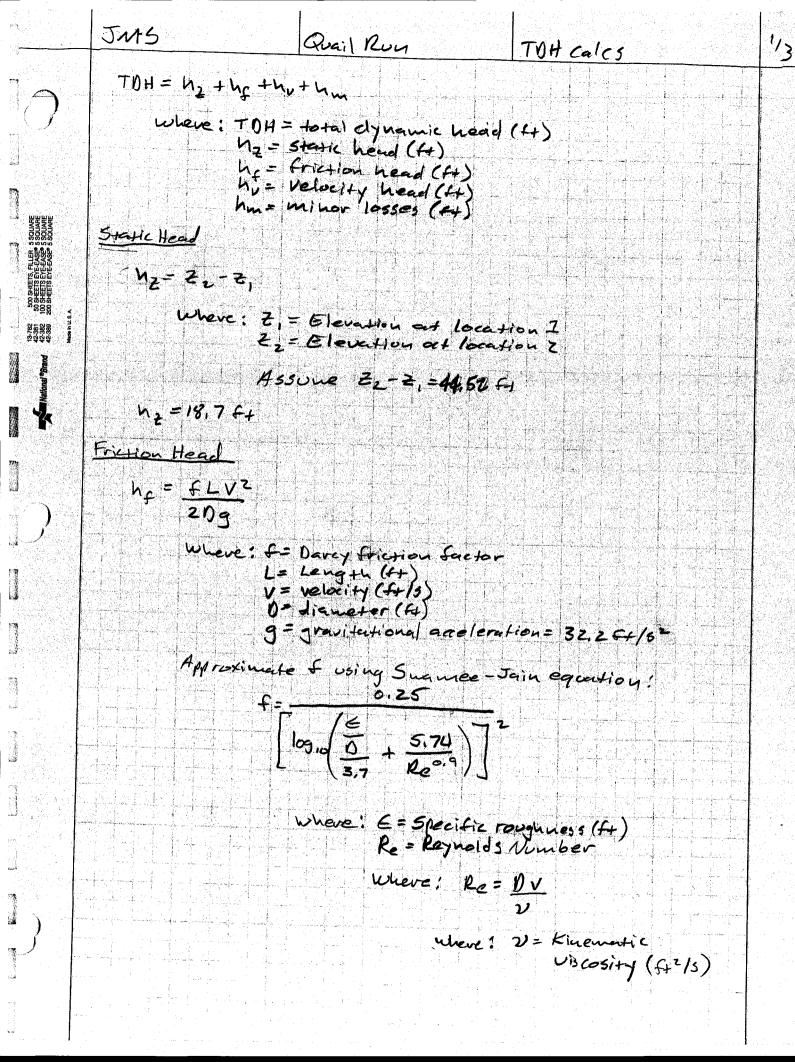
2.6 persons per dwelling unit

Total @ 5 otal @ 6 otal @ 9 otal @ 4 otal @ 8 otal @ 11 # Pipe )tal @ 42 Upstream Downstream Node Node 5 3 2 6 8 4 4 2 2 8 임∞ 4|2|4 4 4 4 3|8|6 (feet) 1533.6 1538.92 Estimated Upstream Sewer 1531.22 1533.16 1530 1540.29 1523.88 1536.03 1524.9 1532.02 1536.2 1536.61 1534.64 1535.31 1532.05 1530.82 1528.4 1534.05 1537.16 1538.85 1526.8 1528.02 1531.66 1533.61 1535.38 1533.84 1529.05 1539.87 525.93 Ì٧. Estimated
Downstream
Sewer (feet) 1531.42 1536.03 1530.2 1530 1529.25 1536.63 1534.84 1533.61 1533.81 1527 1529.3 1534.43 1526.13 1523.88 1529.43 1529.43 1531.02 1528.6 1526.56 1532.05 1534.04 1532.25 1522.85 1532.2 1528.02 1534.36 1524.9 1531.3 1531.3 īv. Estimated
Upstream
Proposed
FG Elev. 1545.11 1541.05 1545.12 1548.06 1541.66 1543.72 1544.55 1543.2 1543.11 1543.4 1539.46 1546.49 1542.11 (feet) 1541.47 1546.5 1542.47 1539.92 1543.79 1545.2 1547.62 1540.61 1541.78 1542.52 1543.42 1542.24 1542 1542.05 1544.76 1540.94 Estimated
Downstream
Proposed
FG Elev. (feet) 1545.11 1545.11 1542.11 1542 1542.11 1542.11 1541.66 1541.66 1541.66 1543.2 1542.52 1542.52 1542.47 1542.47 1542.47 1540.35 1540.35 1543.4 1543.4 1541.78 1543.11 1540.94 1542.24 1540.94 Estimated
Depth of
Sewer @
Upstream 13.89 7.89 15.12 7.77 17.57 7.9 7.59 16.07 8 15.38 7.8 7.64 15.31 8.89 9.79 13.38 8.91 8.04 16.15 7.75 (feet) 7.87 7.58 7.94 8.56 7.8 17.78 7.69 7.6 Downstream Estimated Depth of Sewer @ Node (feet) 13.69 9.08 14.92 15.12 15.95 8.57 17.5 8.15 17.78 12.23 12.23 17.57 11.17 11.17 15.38 9.04 8.89 8.69 8.36 8.91 8.71 7.68 15.87 9.59 13.18 16.55 Diameter Line **∞**(<u>ī</u> ထထြ œ Estimated Sewer Length 270 612 589 366 573 578 270 368 270 588 484 410 355 415 548 613 559 270 621 368 395 2768 (ft./ft.) 0.0038 0.0050 Proposed Dwelling Slope Units 0.0038 0.0038 0.0038 0.0038 0.0038 0.0045 0.0038 0.0038 0.0120 0.0038 0.0038 0.0054 0.0100 0.0038 0.0038 0.0038 0.0150 0.0121 0.0038 0.0104 8 8 2 2 3 த் க் க 잃이하이 System Population (capita) 47 47 9 3 6 6 C 31 190 28 3 35 3 8688 3668 450 2,790 17,100 Average Daily Flow 0 4,410 1,440 2,790 8,460 5,130 4,230 29,520 270 4,950 2,790 1,170 20,340 2,610 2,610 900 5,850 3,510 900 1,440 Cumulative Average Daily 450 3,240 20,340 270 5,220 8,010 9,180 28,350 4,230 8,010 46,890 2,610 5,220 6,120 11,970 5,130 9,360 38,880 3,060 **4**9,860 8,640 17,100 3,510 4,410 5,850 Ratio Cumulative Avg. Sewer Capacity Daily Flow d/D (%) 6.61 9.21 2.34% 5.85% 12.89% 5.27% 7.34% 7.91% 7.75% 10.86% 3.63% 6.42% 6.06% 6.76% 7.75% 6.61% 8.97% 19.21% 3.62 1629 3.62 10100 3.14 53694 (gpd) 3.62 15313 3.62 15313 Peak Factor 3.62 3.62 2.64 3.62 3.62 3.62 2.74 3.62 3.62 3.62 3.62 3.62 2.56 3.62 3.62 3.62 3.62 2.9 977 17919 10100 4235 58986 0 15964 5213 10100 15313 0 18571 15313 80885 4235 10100 9448 9448 3258 21177 12706 3258 5213 Peak Flow 977 18896 28996 33232 87982 979.2 0 18571 18571 114758 15313 28996 12,706 15964 21177 21177 21177 21177 21177 21177 21177 1896 1896 22154 43331 43331 43331 43331 14335 481,473 479,556 483,143 479,755 571,725 480,396 780,551 480,026 482,101 481,004 479,755 507,365 858,993 479,755 481,184 855,438 481,595 482,101 955,109 482,101 523,229 797,753 482,101 652,545 Sewer Capacity
Ratio
Cumulative
Peak Flow
d/D (%)
0.66 0.67% 0.73% 0.82% 0.81% 0.62% 0.67% 0.73% 0.73% 0.57% 0.70% 0.70% 0.74% 0.73% 0.44% 0.64% 0.70% 0.84% 1.18% 0.60% 1.35% 0.6600 0.97 0.8000 1.18 1.2800 1.75 0.6700 0.98 0.7300 1.07 0.8200 1.20 0.8100 1.19 0.3300 0.49 0.6100 0.90 1.0000 1.35 0.5700 0.7000 0.7400 0.7300 0.6200 0.6700 0.7300 0.2800 0.7000 0.8300 0.8300 1.0600 0.6000 1.3500 0.7000 0.8400 1.1800 Average Daily Flow Velocity .6400 .6400 0.92 0.98 1.07 1.07 0.84 1.03 1.09 1.07 1.09 0.66 0.95 0.88 0.42 1.03 1.22 1.22 1.03 1.23 (ft/s) 0.97 1.19 Peak Flow Velocity 2.13 2.25 3.81 2.13 2.14 2.13 (ft/s) 2.14 2.45 Full Flow Velocity 2.13 2.13 3.79 2.14 2.14 2.14 2.32 3.54 2.14 4.24 2.13 2.54 2.13 3.46

Œ

P:\QUAIL R		Total @ 35 Total @ 34 Total @ 34 Total @ 3 Total @ 3 Total @ 3	Total @ 37 Total @ 37 Total @ 36 Total @ 36 Total @ 36	49 94	Pipe
UN\imp\Ma		3 3 45 35 3 3 45 35	36 48	Node Node 8	Upstream
P.∖QUAIL RUN∖imp∖Master Sewer\Master Sewer Worksheet.xls		2 2 34	35 35	Node 49	Downstream
aster Sewer V		1524.28 1530.83 1523.25 1522.65 1522.65 1522.05	1526.36 1525.16 1531.51	Sewer Inv. 1534.99 1531.91 1538.28	Estimated Upstream
Vorksheet.xls		1523.25 1528.73 1522.17 1522.17 1521.97 1520.58 1531.74	1525.36 1525.36 1524.48 1529.39	Sewer Inv.  1nv.  1532.11  1529.89  1529.69	Estimated Downstream
		1540.15 1538.73 1539.11 1540.35 1541.19 1540	1543.11 1543.11 1541.11 1539.48	Proposed FG Elev. 1543.06 1539.67 1543.49	Estimated Upstream
		1539.11 1539.11 1541.19 1541.19 1541.19 1540.43	1541.11 1541.11 1540.15 1540.15	Proposed FG Elev. FG Elev. 1539.67 1541.39 1541.39	Estimated Downstream
		15.87 7.9 15.86 17.7 19.22 7.95	16.75 16.75 15.95 7.97	Sewer @ Upstream Node Node 8.07 7.76 5.21	Estimated Depth of
		15.86 10.38 19.02 19.22 19.22 19.85 8.69	15.75 15.75 15.67 10.76	Sewer @ Downstream Node 7.56 11.5 11.7	Estimated Depth of
		<b>ω</b> ω α α α α	ω ω ω	Diameter 8	Line
		270 421 270 180 366 62	263 263 180 423	Length 369 270 370	Estimated Sewer
		0.0038 0.0050 0.0040 0.0038 0.0038	0.0038 0.0038 0.0050	Slope 0.0078 0.0078 0.0078	Proposed
		112 111 123 20 20 213 213 213 213 213	68 68 21 5 13	Units 51 10 00 111	Dwelling
	<b>8</b>	0 31 289 320 0 5 5 554 554 879	177 55 242 13 13 242 242 242	Population 133 177 26 26 29 55	System
		0 2,790 26,010 0 450 28,800 49,860 2,610 450 79,110	15,930 4,950 1,170 3,060 21,780		
		83.2.3.79.22. 23.22.2	900 900 16,830 21,780 2,780 1,170 4,230 26,010	10000 1000 100000 1000000	$\overline{}$
		5.45% 15.77% 16.59% 2.34% 16.59% 21.71% 5.27,40% 5.68% 27.40%	3.22% 3.22% 12.44% 7.16% 14.48% 3.63% 6.61% 14.48%		ve Sewer Capacity
		2 0 2 10100 2 10100 2 1629 2 1629 4 78912 5 127642 5 127642 2 9448 2 9448 2 9448 2 1629 2 191446	2 3258 0 0 4 50020 2 17919 2 4235 2 11077 63162		
		22 1 9 22 8 1 8 8 1			Cumulativ
		482,101 551,277 493,664 479,755 481,026 551,933	1,238,266 481,308 481,308 479,755 552,585		/e Total
		7 10.01% 27.28% 4 4.23% 5 4.23% 5 28.51% 35.60% 35.60% 3 10.46% 45.93%	5.85% 5.85% 22.16% 13.17% 6.66% 5.86% 6.2597%		Sewer Capacity
		0.5800 1.1400 0.3300 1.1700 1.3800 0.5700 0.6000 1.5800	0.4100 0.4100 0.9800 0.6900 0.4400 0.4400 0.6600 1.0800		
		00 0.86 00 0.49 00 0.88 00 0.84 00 0.88	00 0.61 00 1.39 00 1.02 00 0.66 00 0.66 00 0.97		
		2.14 5 2.44 7 2.19 2.13 2 2.13 8 2.13	1 5.49 1 2.13 9 2 3 8 2.13 7 2.45		k Full Flow

APPENDIX C



2/:

Velocity Head

$$h_v = (3.95)^2$$

Minor Head Losses

$$h_0 = \frac{1}{29}$$

$$h_8 = \frac{66.5(3.95)^2}{2(32.2)}$$

TOH = 44,52+ 186.67 + 0.24+16116= 247.59

TOH = 247,59 ft

**Evolution Engineering LLC** John Bishop

PUMP DATA SHEET 11/15/04 Hydromatic Pumps.60 Vers: Dec 2003 **HYDROMATIC** 

HP HYDROMATIC

lection list: --

Pump: S4LRC Type: VORTEX-4 Synch speed: 3600 rpm

Impeller:

Specific Speeds: Ns: --

Dimensions: Suction: -- in

Pump Limits: Temperature: 140 °F Pressure: - psi g Sphere size: 3 in

Motor: Consult vendor

Speed: 3450 rpm Dia: 8.25 in

Curve no.: PAGE 109

Nss: -

Discharge: 4 in

Power: -- hp Eye area: - in2 Search Criteria: Flow: 155.39 US gpm

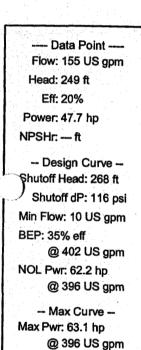
Fluid: Water at 60 °F SG: 1 Viscosity: 1.105 cP

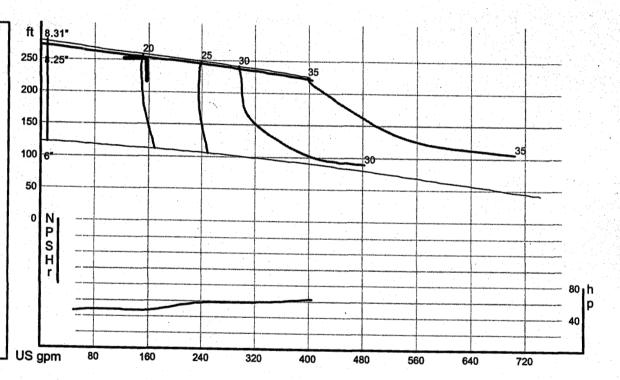
NPSHa: -- ft

Advanced Criteria: none specified

Head: 247.54 ft

Vapor pressure: 0.2563 psi a Atm pressure: 14.7 psi a

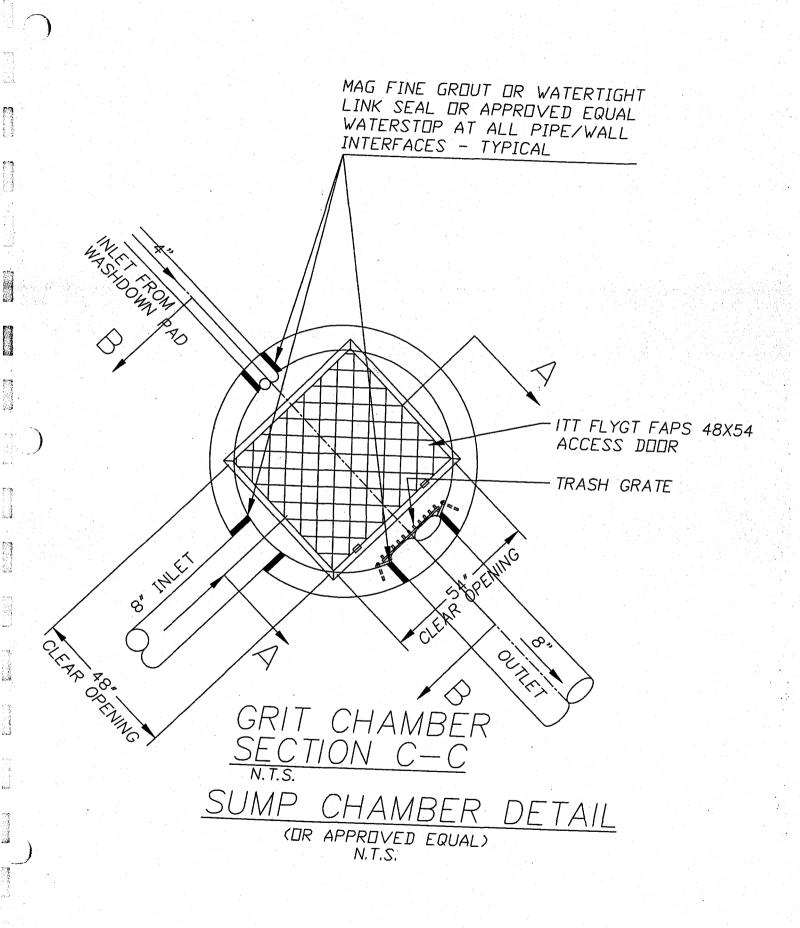


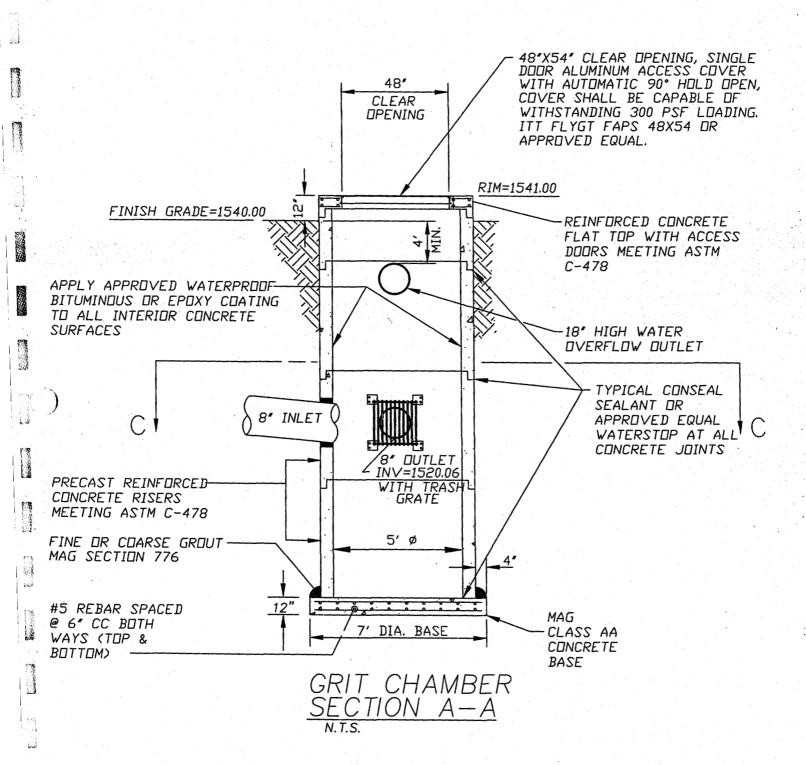


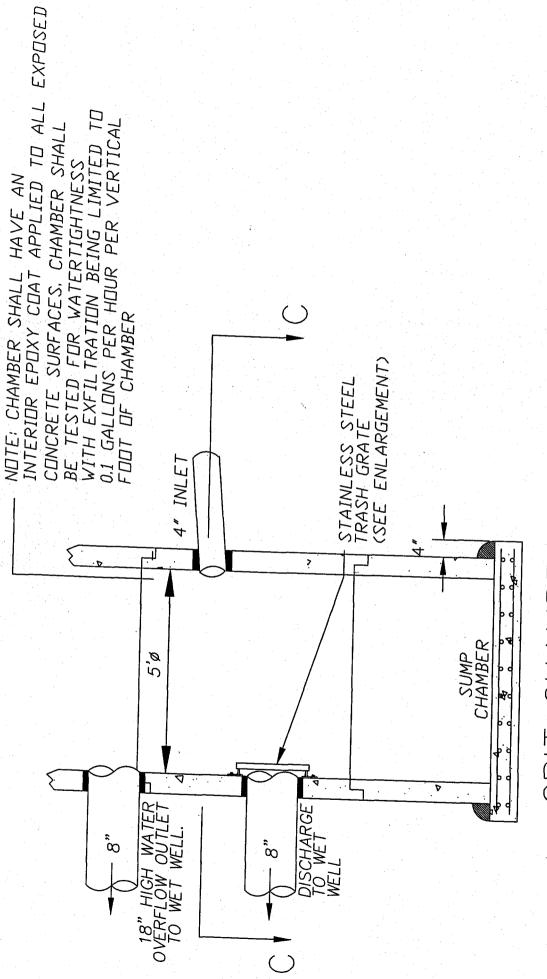
#### Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Pump %eff	Power hp	NPSHr ft
186	3450	246	22	51.4	IL .
155	3450	249	20	47.7	
124	3450	253	17	47.8	
93.2	3450	256	12	48.2	
62.2	3450	260	9	47.1	-

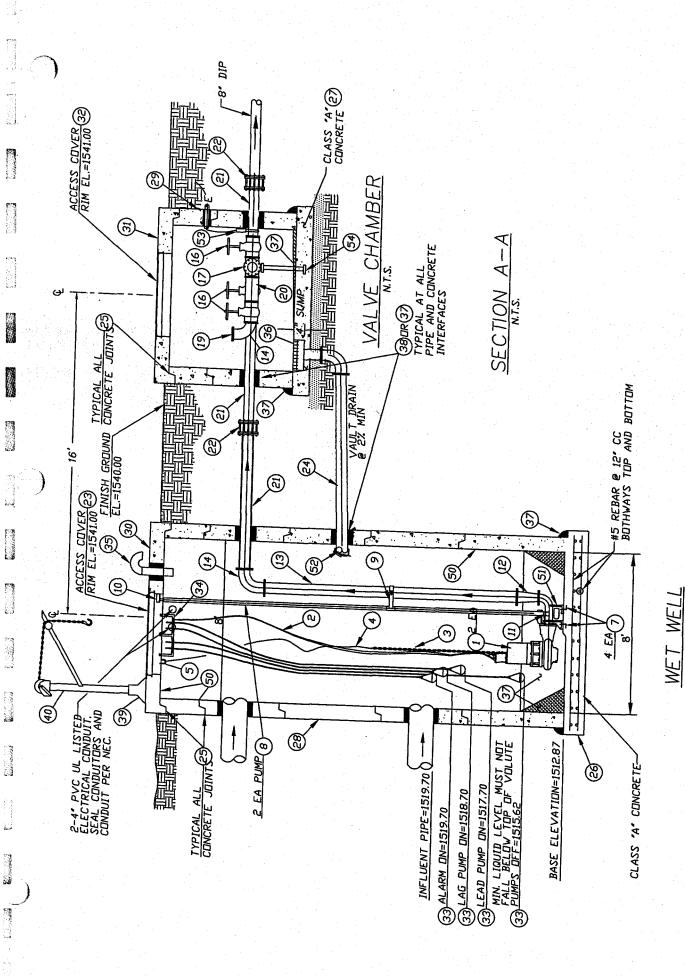
APPENDIX D



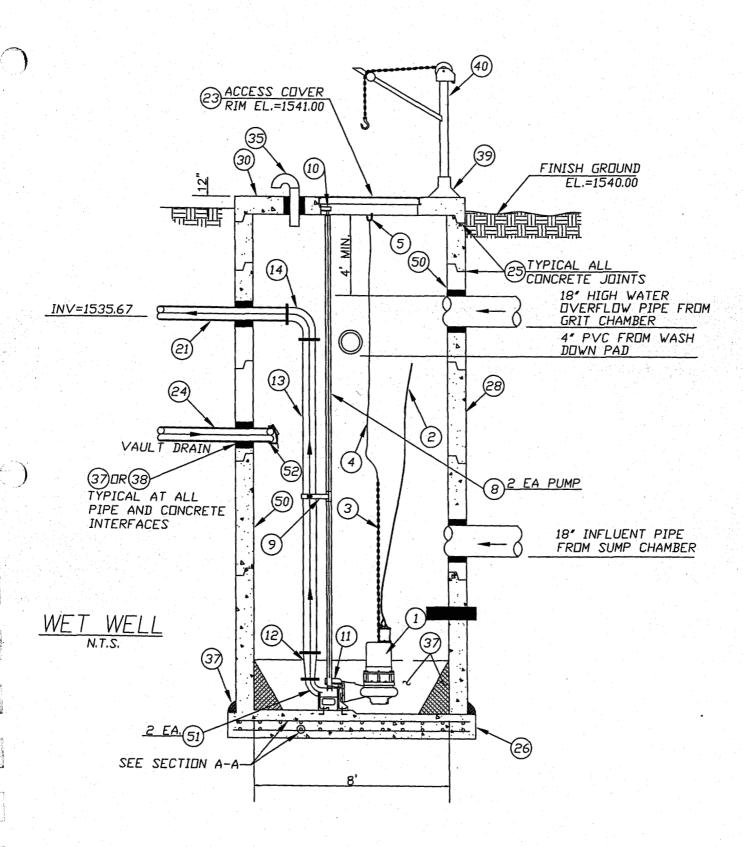




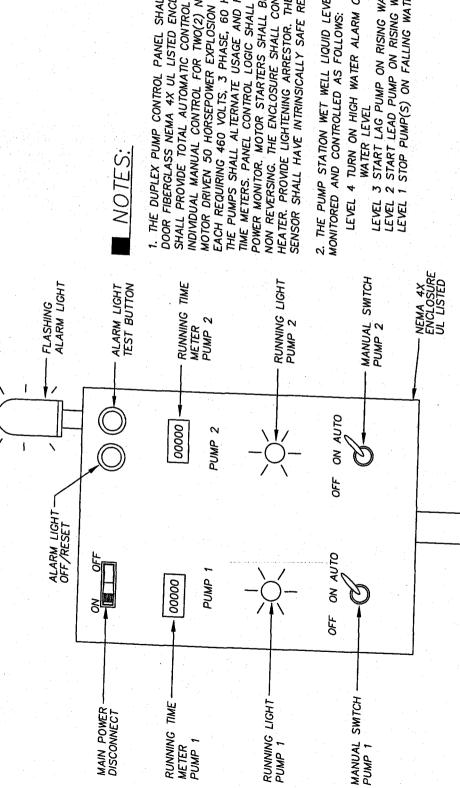
GRIT CHAMBER SECTION B-B



WET WELL & VALVE CHAMBER DETAILS COR APPROVED EQUALS



SECTION B-B



1. THE DUPLEX PUMP CONTROL PANEL SHALL BE A DOUBLE DOOR FIBERGLASS NEMA AX UL LISTED ENCLOSURE AND SHALL PROVIDE TOTAL AUTOMATIC CONTROL AS WELL AS INDIVIDUAL MANUAL CONTROL FOR TWO(2) NON—CLOG MOTOR DRIVEN 50 HORSEPOWER EXPLOSION PROOF PUMPS, EACH REQUIRING 460 VOLTS, 3 PHASE, 60 HERTZ ELECTRICITY. THE PUMPS SHALL ALTERNATE USAGE AND HAVE INDIVIDUAL POWER MONITOR. MOTOR STARTERS SHALL BE FULL VOLTAGE NON REVERSING. THE ENCLOSURE SHALL CONTAIN A SPACE HEATER. PROVIDE LIGHTENING ARRESTOR. THE WATER LEVEL SENSOR SHALL HAVE INTRINSICALLY SAFE RELAYS.

1

A CONTRACTOR

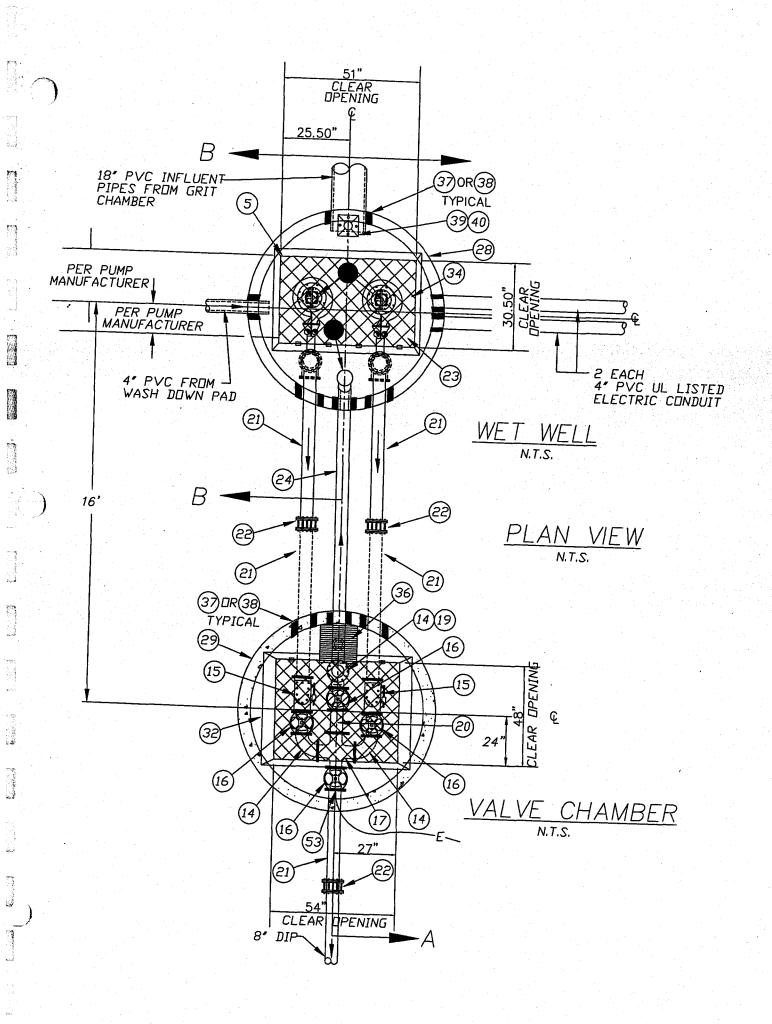
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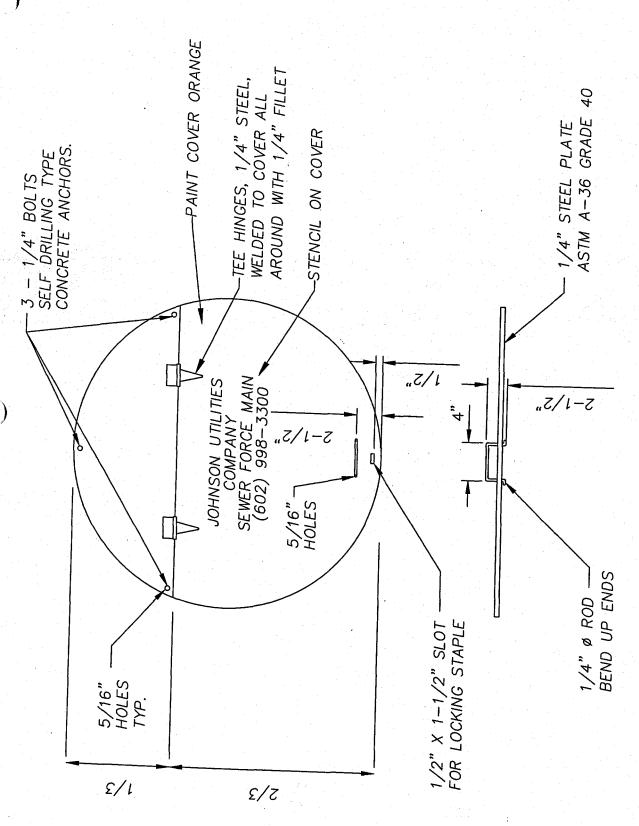
1

2. THE PUMP STATION WET WELL LIQUID LEVEL SHALL BE MONITORED AND CONTROLLED AS FOLLOWS: LEVEL 4 TURN ON HIGH WATER ALARM ON RISING LEVEL 3 START LAG PUMP ON RISING WATER LEVEL LEVEL 2 START LEAD PUMP ON RISING WATER LEVEL LEVEL 1 STOP PUMP(S) ON FALLING WATER LEVEL

(OR APPROVED EQUAL) CONDUIT TO PUMPS. SEAL CONDUITS & CONDUITS

PUMPS' CONTROL PANEL

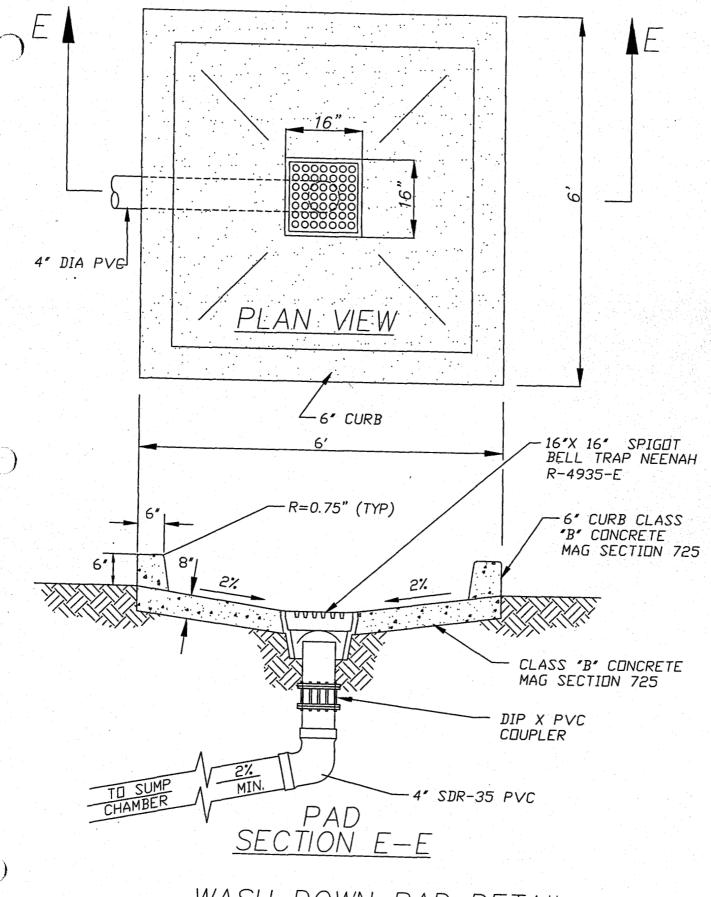




100000

S. Carlotte Co.

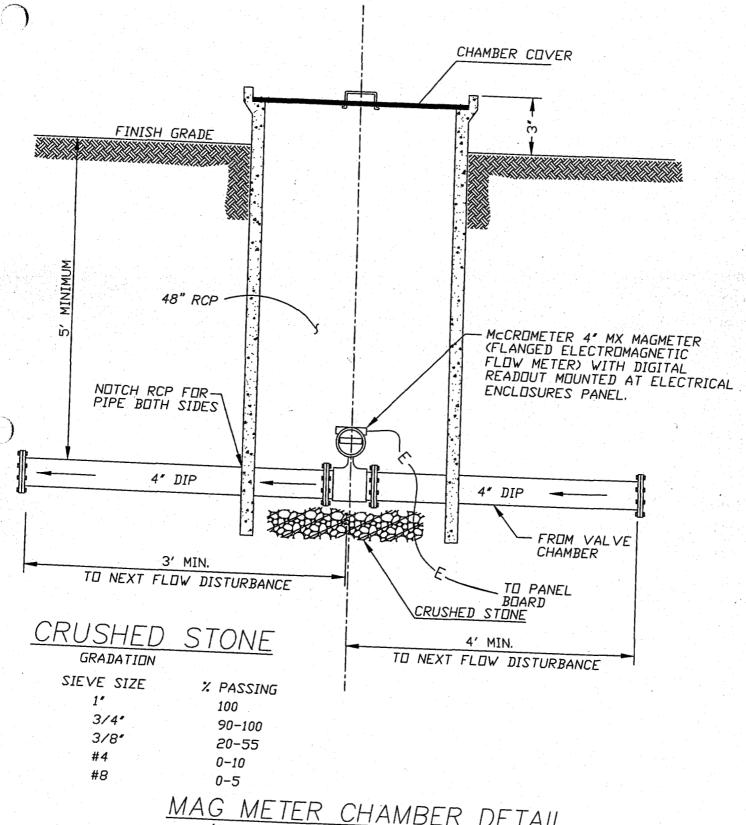
VAL VE CHAMBER COVER DETAIL OR APPRIVED EQUALS (NON-TRAFFIC AREAS)



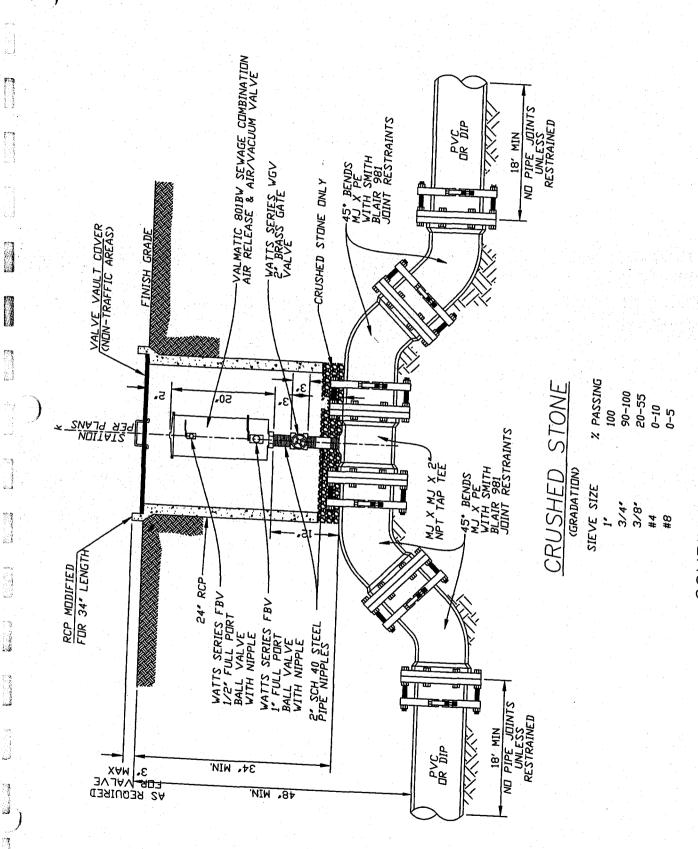
WASH DOWN PAD DETAIL

(OR APPROVED EQUAL)

N.T.S.



MAG METER CHAMBER DETAIL (OR APPROVED EQUAL) N.T.S.



1

COMBINATION AIR/VACUUM RELEASE VALVE AND CHAMBER DETAIL OR APPROVED EQUALS (NON-TRAFFIC AREAS)

SIZE OF CONCRETE PAD PER GENERATOR SUPPLIER RECOMMENDATIONS AUTOMATIC TRANSFER SWITCH (WITH EXERCISER) SIZED BY MANUFACTURER GENERATOR TO BE SIZED BY MANUFACTURER TO SUPPLY ALL PUMP STATION POWER NEEDS. 6"X 6"X W10 X W10 WELDED WIRE FABRIC RECOMMENDATIONS SEE GENERATOR MANUFACTURER NATURAL GAS DR DIESEL FUEL GENERATOR CLASS 'AA', 4000 PSF-CDNCRETE SEE GENERATOR MANUFACTURER

100

The state of the s

A) Color Color

GENERATOR & TRANSFER SWITCH DETAIL

(OR APPROVED EQUAL) N.T.S.

## MASTER WATER DESIGN REPORTS

#### RECEIVED

DEC 2 1 2004

LAND ACQUISITION

# MASTER WATER REPORT FOR QUAIL RUN

December 21, 2004

Prepared for:

Danto Real Estate Investments, Inc.

2250 E Beachcomber Dr.

Gilbert, AZ 85234

Prepared by:

Evolution Engineering L.L.C.

1731 E. Orangewood Avenue

Phoenix, AZ 85020 (602) 944-1144



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#### INTRODUCTION

Quail Run is an approximately 100 acre single family residential development located in unincorporated Pinal County. The site will consist of single family residences with open space corridors throughout. The site is bounded on the north by Bella Vista Road, unsubdivided land on the east and south and by Quail Run Road on the west. More specifically, the site is located in a portion of the west half of the west half of Section 24, Township 3 South, Range 8 East, of the Gila and Salt River Base and Meridian, Pinal County, Arizona. See Figure 1 for vicinity map. The land surrounding Quail Run is currently unsubdivided. There is residential development planned to the north and west of the site.

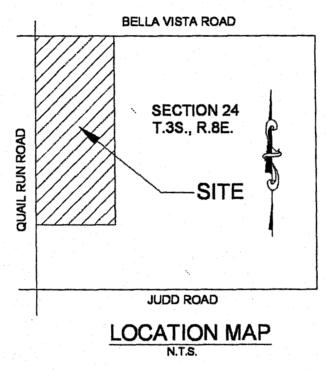


Figure 1: Vicinity Map

The purpose of this report is to analyze the conceptual design of the onsite water system for Quall Run. This report recommends line sizes and locations as well as presents the requirements for other water appurtenances associated with the development of Quail Run.

#### **DESIGN CRITERIA**

There were two types of demands used for this study. Type 1 demands consist of residential demands, subject to peaking factors. Type 2 demands represent irrigation requirements for developed open space and parks. Type 2 demands were not subjected to maximum day and peak hour factors in this study.

For purposes of this study, the average day demand for single family residential development (Type 1) is 100 gallons per capita per day (gpcd) with 2.6 capita/dwelling unit (DU), as obtained from the WLB report. This produces an average day demand of 260 gpd/DU or 0.18 gallons per minute (gpm). The average day demand is multiplied by a peaking factor of 1.8 to determine max day demands and by a peaking factor of 3.0 to determine peak hour demands. The demand for developed open space and parks (Type 2) is 1,500 gpd/acre, or 1.04 gpm/acre, and is not subject to the max day or peak hour peaking factors. In addition to the demands listed above, fire flow demands were considered at various points throughout the system. The fire flow demand used in this analysis was 1,500 gpm during max day demand for residential fire flow scenarios.

The system was designed to maintain a minimum static pressure of 55 psi. The minimum design pressure used for peak hour and for max day plus fire flow demands were 40 psi and 20 psi, respectively.

It is assumed that Johnson Utilities will adequate storage and booster facilities in place to serve this site prior to its connection to the overall system. There is currently an existing 8 inch water main in Bella Vista Road, adjacent to this site. This report specified a minimum pressure head that must be delivered in the existing water main to service the Quail Run development. Any offsite infrastructure necessary to meet this requirement will be designed and constructed by Johnson Utilities.

The onsite distribution system will be designed in accordance with the Johnson Utilities Company Design Guidelines and Standard Details. Where the Design Guidelines and Standard Details do not provide specific information current Arizona Department of Environmental Quality (ADEQ) and/or Maricopa Association of Governments (MAG) requirements, specifications or details will be used. Water valves will be placed according to current Johnson Utilities and ADEQ requirements. Fire hydrants will be placed in accordance with current, applicable fire codes. Air release valves will be located at system high points. The Hazen-Williams roughness coefficient, C value, for all pipes used is 120; the minimum pipe diameter used is 6 inches; secondary 8 inch distribution loops will be incorporated into the onsite system; and sufficient system loops will be provided to minimize the effects of out of service water mains.

#### **DEMANDS**

As outlined above, there are two types of demands associated with this development: residential and irrigated open space/parks. For hydraulic modeling purposes, these demands were assigned the labels of Type 1 and Type 2, respectively. Residential demands are based upon per capita usage,

population density and dwelling unit density criteria. Peaking factors are applied to the average day residential demands to determine max day and peak hour demands. Open space and park demands are determined on a per acre basis and are not subject to the max day and peak hour peaking factors. The demands for this project are summarized below in Tables 1 through 4.

Land Use	Ave Day	Capita/DU	Dwelling Units	Dev. Open	Ave Day
	Demand			Space (acre)	Demand (gpd)
Single Family	100 gpcd	2.6	351	N/A	91,260
Developed Open Space	1,500 gal/acre	N/A	N/A	19	28,500
				Total	119.760

Table 1: Average Day Demands

	Averag Dem	-	Max Day Demand			Peal	Hour Dem	and
Land Use	gpd	gpm	Peaking Factor	gpd	gpm	Peaking Factor	gpd	gpm
Single Family	91,260	63.4	1.8	164,268	114.1	3.0	273,780	190.2
Developed Open Space	28,500	19.8		28,500	19.8		28,500	19.8
Total	119,760	83.2		192,768	133.9		302,280	210.0

Table 2: Max Day and Peak Hour Demands

In addition to the residential and developed open space demands presented above, there is also a fire flow requirement. The residential fire flow requirement considers an additional 1,000 gpm demand during the max day demand scenario. The total fire flow demand is presented in Table 3.

	Max Day D	emand	Fire Flow Demand	Max Day + Fire Flow Demand				
Land Use	gpd	gpm	(gpm)	(gpm)				
Single Family	164,268	114.1	1,000	1,114.1				
Developed Open Space	28,500	19.8		19.8				
Total	192,768	133.9		1,133.9				

Table 3: Max Day Plus Fire Flow Demand

From the demand tables above, it is evident that the max day plus fire flow demand scenario will govern the design of the onsite water system. Note that the required minimum pressures during the peak hour demand scenario are greater than those required during the max day plus fire flow scenario.

Therefore, the peak hour demand scenario will also be analyzed to ensure that the pressure requirements are satisfied.

#### **EXISTING FACILITIES/CONDITIONS**

The existing water system infrastructure for this area is minimal. There is an existing 8 inch water main in Bella Vista Road, adjacent to this site, along the northern border of this property. There are other developments planned for the area and should be considered in the overall Johnson Utilities modeling as more reliable design information becomes available.

The existing water line in Bella Vista Road is fed primarily from the Johnson Utilities Main Plant located to the west, in Johnson Ranch. Also, as mentioned above, it was assumed that the Johnson Utilities water system has adequate storage and pumping capacity to meet the needs of this site. This report determined a minimum amount of head that must be supplied to the Quail Run connection to the existing water line and it was assumed that Johnson Utilities has adequate infrastructure to supply this pressure. This data was used in the development of the hydraulic models presented in this report and is discussed in more detail below.

#### PROPOSED FACILITIES

Although the development may be phased, the proposed facilities were sized based upon the full buildout requirements for the site. No offsite construction is anticipated with this development and is not considered in any of the attached analyses. Any buy-back or extension agreements for offsite infrastructure will need to be negotiated by the developer and Johnson Utilities.

The onsite water system will be constructed of C900 PVC per Johnson Utilities requirements. The onsite system will consist of 8 inch lines throughout the site. Each portion of the subdivision will be served by an 8 inch interior loop to minimize outages experienced due to waterline breaks and maintenance. Onsite lines will be connected to the existing water main adjacent to the project. Two 8 inch connections will be provided to serve this site, one at the northern entrance to the subdivision and the second at the northeastern corner of the subdivision.

Onsite service lines shall be 1 inch diameter and installed per Johnson Utilities and MAG standard details. Based upon the modeling results included herein, it is not anticipated that PRV's will be required with this project.

#### WATER MODEL

The program used to analyze the pipe hydraulics for this project was KYPIPE4 (version 1.2). KYPIPE was used to model the proposed junction node pressures, demands, line sizes, losses and the head supplied to the system. The proposed water network layout for each demand scenario is shown in the corresponding appendices.

For modeling purposes, the elevation at each junction nodes was assumed to be 4.5 feet below proposed grade. Demands at each node were determined based upon the probable number of lots and area of open space that will draw from respective nodes. The demands used were described above in the Demands section of this report.

Pipe sizes were modeled as shown in the figures included in the appendices. The onsite pipes consist of 8 inch lines throughout. The existing pipe diameter was used for the line Bella Vista Road, as described above in the Existing Facilities/Conditions section of this report. A Hazen-Williams roughness coefficient, C, of 120 was used for all pipes in the network. Minor losses, through valves, tees and elbows, were accounted for throughout the system. It was assumed that that there were at least two valves per tee. The loss coefficients used for losses associated with fittings is summarized below in Table 4.

Fitting Type	Minor Loss Coefficient
45° Elbow	0.35
90° Elbow	0.75
Standard Tee	0.4
Open Gate Valve	0.17

**Table 4: Minor Loss Coefficients** 

For the hydraulic model a reservoir was used to represent to Quail run connection to the existing system and the head was varied for each demand scenario. The difference between the reservoir elevation and grade represents the amount of head that the system must supply to meet the minimum pressure requirements. Again, it is assumed that Johnson Utilities has existing facilities that are capable of supplying the minimum amount of head to the system. Minimum pressure requirements, as described above, will all be met or exceeded as modeled in this study. The minimum and maximum pressures for each demand scenario are presented below in Table 5.

Demand Scenario	Max Pressure (psi)	At Junction Node	Req'd Max Pressure (psi)	Min Pressure (psi)	At Junction Node	Req'd Min Pressure (psi)
Average Day	47.63	J-27	80	43.79	J-11	
Max Day	47.58	J-27	80	43.75	J-11	
Peak Hour	47.47	J-27	80	43.69	J-11	40
Fire Flow	44.94	J-4	80	34.81	J-38	20

Table 5: Max and Min Pressures

The fire flow scenario presented in this report placed a residential fire flow demand at junction node J-38. Fire flows were considered at all nodes throughout the system, with the results included in Appendix E. The residential fire flow demand at junction J-38 produced the "worst case" results. That is, the fire flow demand at this node produced a pressure that was less than all other cases considered.

As discussed previously, it has been assumed that Johnson Utilities has facilities in place that will adequately serve this site. It should be noted that to meet the minimum pressure requirements in the residential fire flow scenario will require approximately 1,136 gpm at 95 feet of head to be delivered to the Quail Run connection to the existing line in Bella Vista Road.

For this study the maximum pressure allowed in the system is 80 psi (before pressure reducing measures are necessary). The maximum pressures, as modeled for this study, do not exceed 80 psi. In addition to the 80 psi maximum pressure requirement a minimum static pressure of 55 psi was also considered for this study. The highest onsite nodes, J-11 and J-12, are at an elevation of approximately 1543.90, 2.6 feet higher than the test hydrant. In a static condition 2.6 feet equates to a pressure loss of approximately 1.1 psi, indicating that to achieve a static pressure of 55 psi at the highest point in the system will require that 56.5 psi be supplied at the Quail Run connection to the existing system.

The full KYPIPE report for each demand scenario is included in the appendices that follow this text. Each report details the results of the hydraulic analysis performed for each demand scenario and lists pipeline and node data. The pipeline data include the length, diameter, connecting nodes, roughness, head loss, and line velocity. The junction data listed include the demand, elevation, hydraulic grade, and pressure.

Based upon the results summarized in the tables above and from the reports presented in the appendices, the water transmission system, as designed and presented here, will adequately serve the Quail Run development. Pressures at

each node within the system meet or exceed the minimum pressure requirements for each demand scenario. The maximum pressure of 80 psi will not be exceeded. As facilities come on line and are connected to the system, this model will need to be updated to reflect actual head and elevation data.

#### SUMMARY/CONCLUSIONS

The proposed water system for Quail Run, as presented in this report, will adequately supply this subdivision and meet the design criteria as established by Johnson Utilities. Pressures at each node in the system meet or exceed the minimum required pressures for each demand scenario. For the demand scenarios presented above, it was assumed that Johnson Utilities has infrastructure facilities available to deliver the required flows at adequate head, as discussed above. While it is anticipated that development of this project might occur in phases, the entire onsite water system will be constructed at the same time.

The line sizes, proposed grades and pressure supply node information used in this model represents the best available data at the time of this report.

## APPENDIX A: AVERAGE DAY MODELING RESULTS

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00001

PIPELINE RESULTS

J-41 J-42

J-40

J-35

P-53

STATUS CODE:	XX -CLOSED	PIPE	CV -CHECK VALV	E			
PIPE NAME	NODE #1	NUMBERS	FLOWRATE	HEAD	MINOR	LINE	HL/
	#1	#2		LOSS	LOSS	VELO.	1000
			(gpm)	(ft)	(ft)	(ft/s)	(ft/ft)
P- 1	J- 2	J- 3	32.90	0.01	0.00	0.21	0.04
P- 2	J- 1	J- 2	28.06	0.01	0.00	0.18	0.03
P- 3	J- 2	J- 4	1.44	0.00	0.00	0.01	0.00
P- 4	J- 2	J- 8	-9.88	0.00	0.00	0.06	0.00
P- 5	J- 5	J- 1	28.06	0.02	0.00	0.18	0.03
P- 6	J- 3	J- 7	27.74	0.01	0.00	0.17	0.03
P- 7	J- 3	J- 6	3.36	0.00	0.00	0.02	0.00
P- 8	J- 8	J- 5	-55.51	0.02	0.00	0.35	0.10
P- 9	J- 7	J-12	-6.90	0.00	0.00	0.04	0.00
P-10	J- 7	J-10	33.02	0.01	0.00	0.21	0.04
P-11	J-10	J-13	30.93	0.01	0.00	0.19	0.03
P-12 P-13	J-10	J-11	-2.13	0.00	0.00	0.01	0.00
P-13 P-14	J-12	J- 8	-44.18	0.02	0.00	0.28	0.06
P-15	J-11	J-12	-34.80	0.01	0.00	0.22	0.04
P-16	J-11	J- 9	31.60	0.01	0.00	0.20	0.03
P-17	J-13	J- 9	0.86	0.00	0.00	0.01	0.00
P-18	J-13 J-14	J-14	28.45	0.00	0.00	0.18	0.03
P-19	J-14	J-15	4.40	0.00	0.00	0.03	0.00
P-20	J-16	J-16 J-21	21.71	0.00	0.00	0.14	0.02
P-21	J-16	J-17	-5.46	0.00	0.00	0.03	0.00
P-22	J-16	J-18	2.16 21.41	0.00	0.00	0.01	0.00
P-23	J-18	J-22	19.34	0.00	0.00	0.13	0.02
P-24	J-18	J-19	-2.61	0.00	0.00	0.12	0.01
P-25	J-21	J- 9	-30.33	0.01	0.00	0.02	0.00
P-26	J-18	J-20	1.44	0.00	0.00	0.13	0.03
P-27	J-19	J-21	-23.43	0.01	0.00	0.15	0.00
P-28	J-22	J-31	5.22	0.00	0.00	0.03	0.00
P-29	J-22	J-23	12.82	0.00	0.00	0.08	0.01
P-30	J-23	J-24	2.12	0.00	0.00	0.01	0.00
P-31	J-23	J-26	9.26	0.00	0.00	0.06	0.00
P-32 P-33	J-26	J-28	5.13	0.00	0.00	0.03	0.00
P-33 P-34	J-26	J-27	1.08	0.00	0.00	0.01	0.00
P-35	J-28	J-25	2.12	0.00	0.00	0.01	0.00
P-36	J-28	J-33	1.39	0.00	0.00	0.01	0.00
P-37	J-30 J-29	J-19	-19.39	0.00	0.00	0.12	0.01
P-38	J-31	J-34	-1.71	0.00	0.00	0.01	0.00
P-39	J-29	J-30 J-31	-5.62	0.00	0.00	0.04	0.00
P-40	J-32	J-29	-9.39	0.00	0.00	0.06	0.00
P-41	J-32	J-37	-9.09	0.00	0.00	0.06	0.00
P-42	J-34	J-30	0.40 -12.01	0.00	0.00	0.00	0.00
P-43	J-33	J-32	-7.07	0.00	0.00	0.08	0.01
P-44	J-33	J-44	7.56	0.00	0.00	0.04	0.00
P-45	J-35	J-41	1.42	0.00	0.00	0.05	0.00
P-46	J-36	J-35	0.73	0.00	0.00	0.01	0.00
P-47	J-36	J-39	-4.97	0.00	0.00	0.03	0.00
P-48	J-37	J-34	-9.58	0.00	0.00	0.05	0.00
P-49	J-38	J-37	-8.21	0.00	0.00	0.05	0.00
P-50	J-39	J-38	-6.77	0.00	0.00	0.04	0.00
P-51	J-40	J-36	-1.64	0.00	0.00	0.01	0.00
P-52	J-41	J-40	-0.02	0.00	0 00		

-0.02

3.09

0.00

0.00

0.00

0.00 0.02

0.00

0.00

0.00

P-54	J-43	J-42	5.08	0 00	0 00	0.03	0 00
			3.00	0.00	0.00	0.03	0.00
P-55	J-44	J-43	6.52	0.00	0 00	U U4 .	0.00
D E C					. 0.00	0.04	0.00
P-56	J- 5	R- 1	-83.56	0.00	0.00	0.52	0.20
- 00	- J	- T	-03.56	0.00	0.00	0.52	0.29

#### END NODE RESULTS

	· ·					
NODE	NODE	EXTERNAL	HYDRAULIC	NODE	PRESSURE	NODE
NAME	TITLE	DEMAND	GRADE	ELEVATION	HEAD	PRESSURE
		(gpm)	(ft)	(ft)	(ft)	(psi)
 		(35)			(10)	(psr)
J- 1		0.00	1644.98	1541.30	103.68	44.93
J- 2		3.60(0.	18)1644.97	1540.80	104.17	45.14
J- 3		1.80(0.	18)1644.96	1540.80	104.16	45.14
J- 4			18)1644.97	1538.00	106.97	46.36
J- 5		0.00	1645.00	1543.80	101.20	43.85
J- 6		3.36(0.	29)1644.96	1537.30	107.66	46.65
J- 7		1.62(0.	18)1644.96	1541.10	103.86	45.01
J- 8		1.44(0.	18)1644.98	1542.70	102.28	44.32
J- 9		2.12(0.	30)1644.94	1542.90	102.04	44.22
J-10		4.22(0.	37)1644.95	1539.10	105.85	45.87
J-11		1.08(0.	18)1644.95	1543.90	101.05	43.79
J-12		2.48(0.	28)1644.96	1543.90	101.06	43.79
J-13		1.62(0.	18)1644.94	1538.10	106.84	46.30
J-14		2.34(0.	18)1644.93	1537.80	107.13	46.42
J-15			35)1644.93	1536.00	108.93	47.20
J-16		3.60(0.	18)1644.93	1538.20	106.73	46.25
J-17			18)1644.93	1538.10	106.83	46.29
J-18		3.24(0.	18)1644.92	1537.40	107.52	46.59
J-19		1.44(0.	18)1644.92	1539.90	105.02	45.51
J-20		1.44(0.	18)1644.92	1536.30	108.62	47.07
J-21		1.44(0.	18)1644.93	1540.90	104.03	45.08
J-22		1.30(0.	45)1644.92	1536.20	108.72	47.11
J-23		1.44(0.	18)1644.92	1537.00	107.92	46.77
 J-24		2.12(0.	30)1644.92	1536.30	108.62	47.07
J-25			30)1644.92	1535.60	109.32	47.37
J-26			39)1644.92	1535.10	109.82	47.59
J-27			L8)1644.92	1535.00	109.92	47.63
J-28			L8)1644.92	1536.10	108.82	47.15
J-29 J-30			29)1644.92	1535.50	109.42	47.42
J-31			35)1644.92	1539.90	105.02	45.51
J-31			18)1644.92	1537.70	107.22	46.46
J-33			18)1644.92	1537.30	107.62	46.63
J-34			18)1644.92	1536.90	108.02	46.81
J-35			18)1644.92	1538.90	106.02	45.94
J-36			30)1644.92	1536.70	108.22	46.89
J-37			22)1644.92	1538.40	106.52	46.16
J-38			35)1644.92	1539.60	105.32	45.64
J-38		-	8)1644.92	1540.40	104.52	45.29
J-40			8)1644.92	1539.50	105.42	45.68
J-40 J-41			8)1644.92	1539.30	105.62	45.77
J-41			8)1644.92	1538.50	106.42	46.11
J-42		-	6) 1644.92	1537.20	107.72	46.68
J-44			8)1644.92	1538.00	106.92	46.33
3-44 R- 1		1.04(1.0	04) 1644.92	1538.60	106.32	46.07
IV- I			1645.00	1550.00	95.00	41.17

#### SUMMARY OF INFLOWS AND OUTFLOWS

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE NODE (gpm) TITLE
R- 1	03 50

NET SYSTEM OUTFLOW = 0.00 NET SYSTEM DEMAND = 83.56

# APPENDIX B: MAX DAY MODELING RESULTS

## CHANGES FOR NEXT SIMULATION (Change Number = 2)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000

#### PIPELINE RESULTS

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

			on one on the				
PIPE		NUMBERS	FLOWRATE	HEAD	MINOR	LINE	HL/
NAME	#1	#2		LOSS	LOSS	VELO.	1000
			(gpm)	(ft)	(ft)	(ft/s)	(ft/ft)
P- 1	J- 2	J- 3	52.94	0.02	0.00	0.33	0.09
P- 2	J- 1	J- 2	45.83	0.01	0.00	0.33	0.09
P- 3	J- 2	J- 4	2.64	0.00	0.00	0.02	0.00
P- 4	J- 2	J- 8	-16.35	0.01	0.00	0.10	0.01
P- 5	J~ 5	J- 1	45.83	0.04	0.00	0.29	0.07
P- 6	J- 3	J- 7	44.78	0.01	0.00	0.28	0.07
P- 7	J- 3	J- 6	4.86	0.00	0.00	0.03	0.00
P- 8	J- 8	J- 5	-90.39	0.05	0.00	0.57	0.25
P- 9	J- 7	J-12	-11.39	0.00	0.00	0.07	0.01
P-10	J- 7	J-10	53.20	0.02	0.00	0.33	0.09
P-11	J-10	J-13	50.46	0.02	0.00	0.32	0.08
P-12	J-10	J-11	· -2.83	0.00	0.00	0.02	0.00
P-13	J-12	J- 8	-71.40	0.04	0.00	0.45	0.16
P-14	J-11	J-12	-56.33	0.03	0.00	0.35	0.10
P-15	J-11	J- 9	51.52	0.02	0.00	0.32	0.08
P-16	J-13	J- 9	1.27	0.00	0.00	0.01	0.00
P-17	J-13	J-14	46.22	0.01	0.00	0.29	0.07
P-18	J-14	J-15	5.90	0.00	0.00	0.04	0.00
P-19	J-14	J-16	36.03	0.01	0.00	0.23	0.04
P-20	J-16	J-21	-9.13	0.00	0.00	0.06	0.00
P-21	J-16	J-17	3.96	0.00	0.00	0.02	0.00
P-22 P-23	J-16	J-18	34.59	0.01	0.00	0.22	0.04
P-24	J-18	J-22	30.55	0.01	0.00	0.19	0.03
P-25	J-18	J-19	-4.53	0.00	0.00	0.03	0.00
P-26	J-21 J-18	J- 9	-49.76	0.02	0.00	0.31	0.08
P-27	J-19	J-20	2.64	0.00	0.00	0.02	0.00
P-28	J-22	J-21 J-31	-38.00	0.01	0.00	0.24	0.05
P-29	J-22	J-23	8.60	0.00	0.00	0.05	0.00
P-30	J~23	J-24	20.36 3.02	0.00	0.00	0.13	0.01
P-31	J~23	J-26	14.70	0.00	0.00	0.02	0.00
P-32	J-26	J-28	8.76	0.00	0.00	0.09	0.01
P-33	J-26	J-27	1.98	0.00	0.00	0.05 0.01	0.00
P-34	J-28	J-25	3.02	0.00	0.00	0.02	0.00
P-35	J-28	J-33	2.77	0.00	0.00	0.02	0.00
P-36	J-30	J-19	-30.82	0.01	0.00	0.19	0.03
P-37	J-29	J-34	-2.59	0.00	0.00	0.02	0.00
P-38	J-31	J-30	-9.09	0.00	0.00	0.06	0.00
P-39	J-29	J-31	-15.05	0.00	0.00	0.09	0.01
P-40	J-32	J-29	-14.72	0.00	0.00	0.09	0.01
P-41	J-32	J-37	0.71	0.00	0.00	0.00	0.00
P-42	J-34	J-30	-19.37	0.00	0.00	0.12	0.01
P-43	J-33	J-32	-11.04	0.00	0.00	0.07	0.00
P-44	J-33	J-44	12.17	0.00	0.00	0.08	0.01
P-45	J-35	J-41	2.73	0.00	0.00	0.02	0.00
P-46	J-36	J-35	0.74	0.00	0.00	0.00	0.00
P-47	J-36	J-39	-7.87	0.00	0.00	0.05	0.00
P-48	J-37	J-34	-15.46	0.00	0.00	0.10	0.01
P-49	J-38	J-37	-13.81	0.00	0.00	0.09	0.01
P-50	J-39	J-38	-11.17	0.00	0.00	0.07	0.01
P-51	J-40	J-36	-2.88	0.00	0.00	0.02	0.00
P-52 P-53	J-41	J-40	0.09	0.00	0.00	0.00	0.00
F-33	J-42	J-35	5.45	0.00	0.00	0.03	0.00

P-54	J-43	J-42	8.49	0.00	0.00	0.05	0.00
P-55	J-44	J-43	11.13				
P-56	J- 5	R- 1	-136.21	0.01	0.00	0.85	0.73

#### END NODE RESULTS

	NODE	NODE	EXTERNAL	HYDRAULIC	NODE	PRESSURE	NODE
	NAME	TITLE	DEMAND	GRADE	ELEVATION	HEAD	PRESSURE
			(gpm)	(ft)	(ft)	(ft)	(psi)
			 				(251)
	J- 1		0.00	1644.95	1541.30	103.65	44.91
	J~ 2			.33)1644.93	1540.80	104.13	45.13
	J- 3			33)1644.91	1540.80	104.11	45.11
	J- 4			33)1644.93	1538.00	106.93	46.34
	J- 5		0.00	1644.99	1543.80	101.19	43.85
	J- 6			42)1644.91	1537.30	107.61	46.63
	J- 7			33)1644.90	1541.10	103.80	44.98
	J- 8		•	.33)1644.94	1542.70	102.24	44.30
	J- 9		-	43)1644.85	1542.90	101.95	44.18
	J-10			48)1644.87	1539.10	105.77	45.83
	J-11			.33)1644.87	1543.90	100.97	43.75
	J-12			41)1644.90	1543.90	101.00	43.77
•	J-13			.33)1644.85	1538.10	101.00	
	J-14			.33)1644.84	1537.80	107.04	46.26
	J-15			47) 1644.84	1537.00	107.04	46.38
	J-16		5.50(0.	.33)1644.83	1538.20	106.63	47.16
	J-17			.33)1644.83	1538.20	106.63	46.20
	J-18			.33) 1644.81	1537.40	107.41	46.25
	J-19		2 64 (0	.33)1644.81	1539.90	107.41	46.55
	J-20		2.64(0	33)1644.81	1536.30		45.46
	J-21			.33)1644.83	1540.90	108.51	47.02
	J-22			.55)1644.81	1536.20	103.93	45.04
	J-23			.33)1644.80	1537.00	108.61	47.06
	J-24		-	.43)1644.80	1536.30	107.80	46.71
	J-25			43)1644.80	1535.60	108.50 109.20	47.02
	J-26			.50)1644.80	1535.00	109.20	47.32 47.54
	J-27			33) 1644.80	1535.10		
	J-28			.33)1644.80	1536.10	109.80 108.70	47.58
	J-29			42)1644.80	1535.50	109.30	47.10
	J-30		-	47) 1644.81	1539.90	109.30	47.36
	J-31			33) 1644.80	1537.70	107.10	45.46 46.41
	J-32			.33)1644.80	1537.70	107.10	
	J-33			33)1644.80	1536.90	107.90	46.58
	J-34			33)1644.80	1538.90	107.90	46.76
	J-35			43)1644.79	1536.70	103.90	45.89
	J-36			37) 1644.79			46.84
	J-37			47)1644.80	1538.40 1539.60	106.39	46.10
	J-38		-	.33)1644.80	1540.40	105.20	45.59
	J-39			.33)1644.79		104.40	45.24
	J-40			.33)1644.79	1539.50 1539.30	105.29	45.63
	J-41			.33)1644.79		105.49	45.71
	J-42		•	.33) 1644.79	1538.50	106.29	46.06
	J-43			.33)1644.79	1537.20	107.59	46.62
	J-44				1538.00	106.79	46.28
	R- 1		1.04(1.	.04)1644.80	1538.60	106.20	46.02
	r. T			1645.00	1550.00	95.00	41.17

#### SUMMARY OF INFLOWS AND OUTFLOWS

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE		
R- 1	136 21			

NET SYSTEM OUTFLOW = 0.00 NET SYSTEM DEMAND = 136.21

# APPENDIX C: PEAK HOUR MODELING RESULTS

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 3 TRIALS: ACCURACY = 0.00000

PIPELINE RESULTS

STATUS CODE:	XX -CLOSED	PIPE	CV -CHECK VALVE				
PIPE NAME	NODE #1	NUMBERS #2	FLOWRATE	HEAD LOSS	MINOR	LINE VELO.	HL/ 1000
			(gpm)	(ft)			(ft/ft)
P- 1	J- 2	J- 3	80.98	0.05	0.00	0.51	0.20
P- 2	J- 1	J- 2	70.73	0.03	0.00	0.44	0.16
P- 3	J~ 2	J- 4		0.00	0.00	0.03	
P- 4	J- 2	J- 8	-25.37	0.01	0.00	0.16	0.02
P- 5	J- 5	J- 1	70.73	0.10	0.00		0.15
P- 6	J- 3	J- 7	68.62	0.03	0.00	0.43	0.14
P- 7	U- 3	J- 6	6.96	0.00	0.00	0.04	
P- 8	J- 8	J- 5	-139.19	0.11	0.01	0.87	0.56
P- 9	J- 7	J-12	-17.67	0.01	0.00	0.11	0.01
P-10	J- 7	J-10	81.43	0.05	0.00	0.51	0.20
P-11	J-10	J-13	77.78	0.05	0.00		0.19
P-12	J-10	J-11	-3.81	0.00	0.00	0.02	0.00
P-13	J-12	J- 8	-109.50	0.09	0.00	0.69	0.34
P-14	J-11	J-12	-86.47	0.06	0.00	0.54	0.22
P-15	J-11	J- 9	79.42	0.05	0.00	0.50	0.19
P-16	J-13	J- 9	1.83	0.00	0.00	0.01	0.00
P-17	J-13	J-14	71.09	0.03	0.00	0.45	0.15
P-18 P-19	J-14	J-15	8.00	0.00	0.00		0.00
P-20	J-14	J-16	56.07	0.03	0.00	0.35	0.10
P-21	J-16	J-21	-14.24	0.00		0.09	0.01
P-22	J-16	J-17	6.48	0.00		0.04	0.00
P-23	J-16	J-18	53.03	0.02	0.00	0.33	0.09
P-24	J-18 J-18	J-22	46.23	0.02	0.00		0.07
P-25	J-21	J-19 J- 9	-7.23	0.00		0.05	0.00
P-26	J-18	J-20	-76.97	0.05	0.00	0.48	0.18
P-27	J-19	J-21	4.32	0.00	0.00	0.03	0.00
P-28	J-22	J-31	-58.41 13.31	0.03	0.00	0.37	0.11
P-29	J-22	J-23	13.31 30.90	0.00			0.01
P-30	J-23	J-24		0.01	0.00	0.19	0.03
P-31	J-23	J-26	22.30	0.00	0.00	0.03 0.14	
P-32	J-26	J-28	13.84	0.00	0.00	0.14	0.02
P-33	J-26	J-27	3.24	0.00	0.00	0.09	0.01
P-34	J-28	J-25	4.28	0.00	0.00	0.02	0.00
P-35	J-28	J-33	4.70	0.00	0.00	0.03	0.00
P-36	J-30	J-19	-46.86	0.02	0.00	0.29	0.07
P-37	J-29	J-34	-3.82	0.00	0.00	0.02	0.00
P-38	J-31	J-30	-13.96	0.00	0.00	0.09	0.01
P-39	J-29	J-31	-22.96	0.01		0.14	0.02
P-40	J-32	J-29	-22.60	0.00		0.14	0.02
P-41	J-32	J-37	1.13		0.00	0.01	0.00
P-42	J-34	J-30	-29.69	0.01	0.00	0.19	0.03
P-43	J-33	J-32	-16.61	0.00		0.10	0.01
P-44	J-33	J-44	18.61	0.00	0.00	0.12	0.01
P-45	J-35	J-41	4.54	0.00	0.00	0.03	0.00
P-46	J-36	J-35	0.72	0.00	0.00	0.00	0.00
P-47	J-36	J-39	-11.92	0.00	0.00	0.07	0.01
P-48	J-37	J-34	-23.71	0.01	0.00	0.15	0.02
P-49	J-38	J-37	-21.64	0.01	0.00	0.14	0.02
P-50	J-39	J-38	-17.32	0.00	0.00	0.11	0.01
P-51	J-40	J-36	-4.64	0.00	0.00	0.03	0.00
P-52 P-53	J-41	J-40	0.22	0.00	0.00	0.00	0.00
E-33	J-42	J-35	8.75	0.00	0.00	0.05	0.00

P-54	J-43	J-42	13.25	0.00	0.00	0.08	0.01
P-55	J-44	J-43	17.57	0.01	0.00	0.11	0.01
P-56	J- 5	R- 1	-209.92	0.01	0.01	1.32	1.66

#### END NODE RESULTS

	NODE	NODE	EXTERNAL	HYDRAULIC	NODE	PRESSURE	NODE
	NAME	TITLE	DEMAND	GRADE	ELEVATION	HEAD	PRESSURE
	*******	******	(gpm)	(ft)			
		 	(gpm)	(10)	(ft)	(ft)	(psi)
	J- 1		0.00	1644.89	1541.30	102 50	44.00
	J- 2			54) 1644.85		103.59	44.89
	J- 3				1540.80	104.05	45.09
	J- 4			54) 1644.80	1540.80	104.00	45.07
	J- 5			54) 1644.85	1538.00	106.85	46.30
	J- 6		0.00	1644.98	1543.80	101.18	43.85
	J- 7		•	61)1644.80	1537.30	107.50	46.58
	J- 8			54) 1644.77	1541.10	103.67	44.92
				54) 1644.87	1542.70	102.17	44.27
	J- 9			61) 1644.67	1542.90	101.77	44.10
	J-10			65)1644.72	1539.10	105.62	45.77
	J-11			54) 1644.72	1543.90	100.82	43.69
	J-12		5.36(0.	60)1644.78	1543.90	100.88	43.71
	J-13		4.86(0.	54) 1644.67	1538.10	106.57	46.18
	J-14		7.02(0.	54)1644.64	1537.80	106.84	46.30
	J-15		8.00(0.	64)1644.64	1536.00	108.64	47.08
	J-16		10.80(0,	54)1644.61	1538.20	106.41	46.11
	J-17		6.48(0.	54)1644.61	1538.10	106.51	46.15
	J-18		9.72(0)	54)1644.59	1537.40	107.19	46.45
	J-19			54)1644.59	1539.90	104.69	45.36
	J-20		4.32(0.	54) 1644.59	1536.30	108.29	46.92
	J-21			54)1644.62	1540.90	103.72	44.94
	J-22			70)1644.57	1536.20	108.37	46.96
	J−23			54)1644.56	1537.00	107.56	46.61
	J-24			61)1644.56	1536.30	108.26	46.91
	J-25			61)1644.55	1535.60	108.95	47.21
	J-26			.66)1644.56	1535.10	109.46	47.43
	J-27	•		.54) 1644.55	1535.00	109.55	47.47
	J-28			.54) 1644.55	1536.10	108.45	47.00
	J-29			61)1644.56	1535.50	109.06	47.26
	J-30			.64)1644.57	1539.90	104.67	45.36
	J-31			54) 1644.57	1537.70	106.87	46.31
	J-32		•	54) 1644.55	1537.30	107.25	46.48
	J-33			.54) 1644.55			
	J-34			.54) 1644.56		105.66	45.79
	J-35			.61)1644.54	1536.70		46.73
0.00	J-36			.57) 1644.54	1538.40		45.99
	J-37			.64)1644.55			45.48
	J-38			.54)1644.54			45.13
	J-39			.54)1644.54			45.52
	J-40			.54)1644.54	1539.30		45.60
	J-41			.54)1644.54 .54)1644.54	1539.50		
	J-42			.54)1644.54 .59)1644.54			45.95
	J-43				1537.20		46.51
	J-44			.54)1644.54	1538.00		46.17
	R- 1		1.04(1	.04)1644.55			45.91
	- I			1645.00	1550.00	95.00	41.17

#### SUMMARY OF INFLOWS AND OUTFLOWS

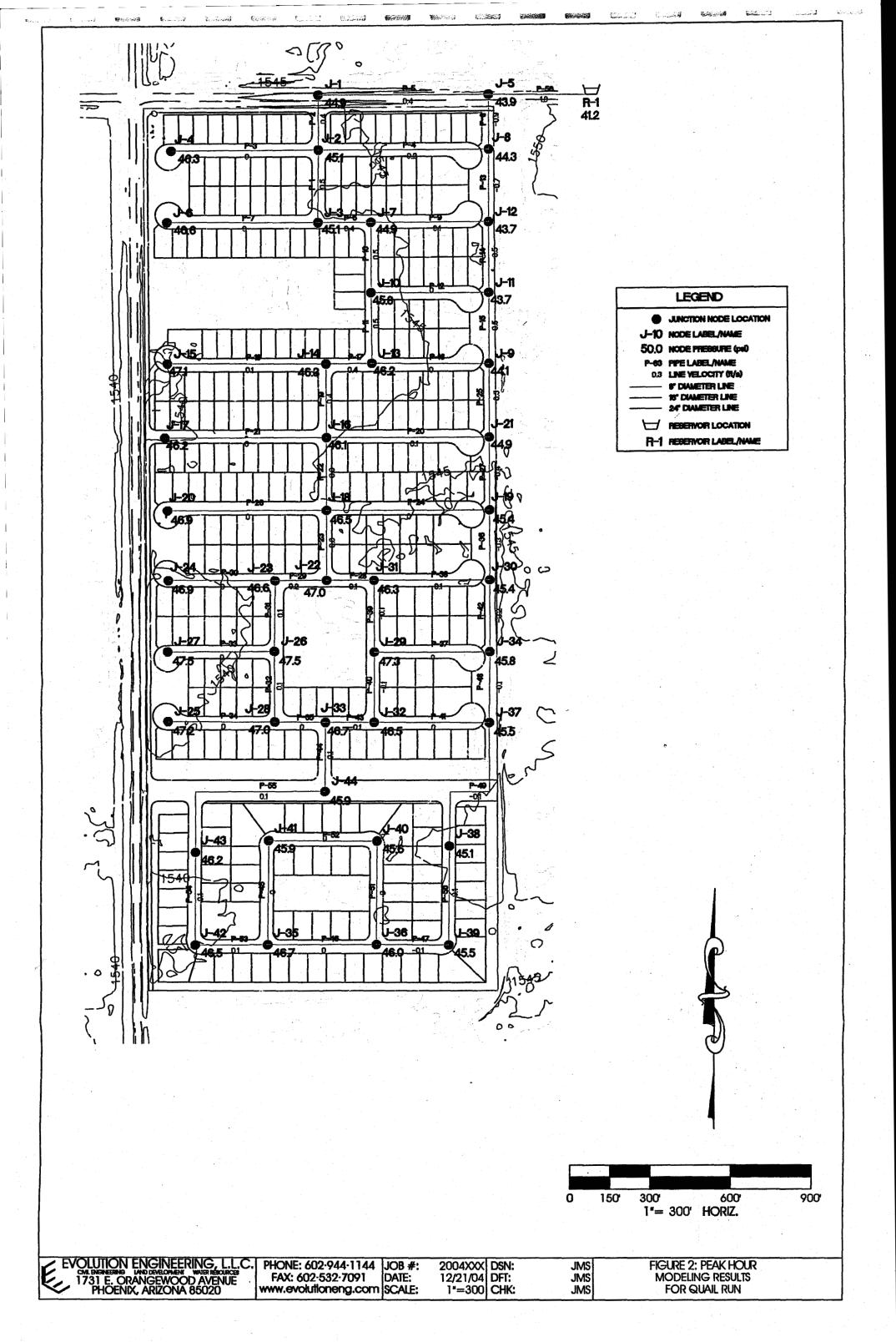
- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
  (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE	
R- 1	209.92		

NET SYSTEM OUTFLOW = 0.00 NET SYSTEM DEMAND = 209.92

## APPENDIX D:

## FIRE FLOW MODELING RESULTS



JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

RESULTS OBTAINED AFTER 4 TRIALS: ACCURACY = 0.00003

PIPELINE RESULTS

STATUS CODE:	XX -CLOSED PIPE	CV -CHECK VALVE	
PIPE	NODE NUMBERS	FLOWRATE HEAD	MINOR LINE
NAME	#1 #2	LOSS	

PIPE NAME	NODE N#1	UMBERS #2	FLOWRATE	HEAD LOSS	MINOR	LINE VELO.	HL/ 1000
			(gpm)	(ft)	(ft)		(ft/ft)
P- 1	J- 2	J- 3	471.42	1.38	0.08	2.96	5.34
P- 2	J- 1	J- 2	377.69	0.68	0.05	2.37	3.60
P- 3	J- 2	J- 4	2.64	0.00	0.00	0.02	0.00
P- 4	J- 2	J- 8	-102.97	0.19	0.00	0.65	0.31
P- 5	J- 5	J- 1	377.69	2.13	0.02	2.37	3.37
P- 6	J- 3	J- 7	463.26	0.97	0.03	2.90	5.01
P- 7 P- 8	J- 3	J- 6	4.86	0.00	0.00	0.03	0.00
P- 8	J- 8 J- 7	J- 5	-758.49	2.48	0.21	4.76	13.20
P-10	J- 7 J- 7	J-12	-82.19	0.09	0.00	0.52	0.20
P-11	J-10	J-10 J-13	542.48 541.31	1.74 1.73	0.11 0.13	3.40	6.94
P-12	J-10	J-11	-4.40	0.00	0.13	3.39 0.03	6.98 0.00
P-13	J-12	J- 8	-652.87	2.51	0.05	4.09	9.41
P-14	J-11	J-12	-567.01	1.89	0.04	3.56	7.24
P-15	J-11	J- 9	560.62	1.86	0.04	3.52	7.09
P-16	J-13	J- 9	53.68	0.04	0.00	0.34	0.09
P-17	J-13	J-14	484.66	0.91	0.00	3.04	5.31
P-18	J-14	J-15	5.90	0.00	0.00	0.04	0.00
P-19	J-14	J-16	474.47	1.42	0.08	2.98	5.40
P-20	J-16	J-21	-56.68	0.06	0.00	0.36	0.10
P-21	J-16	J-17	3.96	0.00	0.00	0.02	0.00
P-22	J-16	J-18	520.59	1.66	0.17	3.26	6.66
P-23	J-18	J-22	515.78	1.56	0.18	3.23	6.64
P-24	J-18	J-19	-3.77	0.00	0.00	0.02	0.00
P-25 P-26	J-21	J- 9	-611.28	2.26	0.05	3.83	8.32
P-20 P-27	J-18	J-20	2.64	0.00	0.00	0.02	0.00
P-28	J-19 J <b>-</b> 22	J-21 J-31	-551.96 227.49	1.85		3.46	6.89
P-29	J-22	J-23	286.70	0.23	0.01	1.43	1.34
P-30	J-23	J-24	3.02	0.00	0.00	0.02	2.01 0.00
P-31	J-23	J-26	281.04	0.52	0.03	1.76	2.06
P-32	J-26	J-28	275.10	0.50	0.03	1.73	1.96
P-33	J-26	J-27	1.98	0.00	0.00	0.01	0.00
P-34	J-28	J-25	3.02	_	0.00	0.02	0.00
P-35	J-28	J-33	269.11		0.01	1.69	1.83
P-36	J-30	J-19	-545.55	1.73	0.04	3.42	6.75
P-37	J-29	J-34	37.39	0.02	0.00	0.23	0.05
P-38	J-31	J-30	-130.68	0.20	0.01	0.82	0.49
P-39	J-29	J-31	-355.53	0.81	0.05	2.23	3.16
P-40	J-32	J-29	-315.23	0.64	0.04	1.98	2.55
P-41	J-32	J-37	230.15	0.58	0.02	1.44	1.39
P-42	J-34	J-30	-412.51	1.07	0.02	2.59	
P-43	J-33	J-32	-82.11	0.04	0.00	0.51	0.20
P-44 P-45	J-33	J-44	349.57	0.75	0.10	2.19	3.27
P-45 P-46	J-35	J-41	121.54	0.16		0.76	0.44
P-46 P-47	J-36	J-35	-217.86	0.49	0.01	1.37	1.22
P-48	J-36 J-37	J-39 J-34	329.53 -448.58	0.70	0.00 0.02	2.07	2.60
P-49	J-38	J-34 J-37	~676.37	1.23 5.98	0.02	2.81 4.24	4.69
P-50	J-39	J-37 J-38	326.23	0.95	0.47	2.05	10.62 2.95
P-51	J-40	J-36	115.93	0.35	0.13	0.73	0.40
P-52	J-41	J-40	118.90	0.15	0.01	0.75	0.41
P-53	J-42	J-35	342.85	0.76	0.06	2.15	3.03

D EA							
P-54	J-43	J-42	345.89	1 00	0 00		
P-55			343.09	1.00	0.00	2.17	2.84
P-35	J-44	J-43					
P-56	~ -			2.05	0.00	2.19	2.88
1-50	U- 5	R- 1	-1136.17	0.26	0.16	7 12	11 17

#### END NODE RESULTS

NODE	NODE	EXTERNAL	HYDRAULIC	NODE	PRESSURE	NODE
NAME	TITLE	DEMAND	GRADE	ELEVATION	HEAD	PRESSURE
		(gpm)	(ft)	(ft)	(ft)	
						(psi)
J- 1		0.00	1642.43	1541.30	101.13	43.82
J- 2		6.60(0.	33)1641.70	1540.80	100.90	43.72
J- 3		3.30(0.	33)1640.24	1540.80	99.44	43.09
J- 4		2.64(0.	33)1641.70	1538.00	103.70	44.94
J- 5		0.00	1644.59	1543.80	100.79	43.67
J- 6		4.86(0.	42)1640.24	1537.30	102.94	44.61
J- 7		2.97(0.3	33)1639.24	1541.10	98.14	42.53
J- 8		2.64(0.3	33)1641.89	1542.70	99.19	42.98
J- 9		3.02(0.4	43)1635.50	1542.90	92.60	40.13
J-10		5.57(0.4	48)1637.40	1539.10	98.30	42.60
J-11		1.98(0.3	33)1637.40	1543.90	93.50	40.52
J-12		3.68(0.4	11)1639.33	1543.90	95.43	41.35
J-13		2.97(0.3	33)1635.54	1538.10	97.44	42.22
J-14			33)1634.63	1537.80	96.83	41.96
J-15			17)1634.63	1536.00	98.63	42.74
J-16			33)1633.13	1538.20	94.93	41.14
J-17			33)1633.13	1538.10	95.03	41.14
J-18			33)1631.31	1537.40	93.91	40.69
J-19		2.64(0.3	33)1631.31	1539.90	91.41	39.61
J-20		2.64(0.3	33)1631.31	1536.30	95.01	41.17
J-21			33)1633.19	1540.90	92.29	39.99
J-22		1.60(0.5	5)1629.57	1536.20	93.37	40.46
J-23		2.64(0.3	3)1629.18	1537.00	92.18	39.94
J-24			3)1629.18	1536.30	92.88	40.25
J-25			3)1628.10	1535.60	92.50	40.23
J-26			0)1628.63	1535.10	93.53	40.53
J-27			3)1628.63	1535.00	93.63	40.53
J-28		2.97(0.3	3)1628.10	1536.10	92.00	39.87
J-29		2.92(0.4	2)1628.47	1535.50	92.97	40.29
J-30		2.36(0.4	7)1629.54	1539.90	89.64	38.84
J-31		2.64(0.3	3)1629.33	1537.70	91.63	39.71
J-32		2.97(0.3	3)1627.79	1537.30	90.49	39.21
J-33			3)1627.76	1536.90	90.86	39.37
J-34		1.32(0.3	3)1628.45	1538.90	89.55	38.81
J-35			3)1623.04	1536.70	86.34	37.41
J-36			7)1622.55	1538.40	84.15	36.46
J-37			7)1627.19	1539.60	87.59	37.96
J-38		1002.60( **	)1620.74	1540.40	80.34	34.81
J-39		3.30(0.3	3)1621.84	1539.50	82.34	
J-40			3)1622.70	1539.30	83.40	35.68 36.14
J-41			3)1622.87	1538.50	84.37	36.14
J-42		3.04(0.3	9)1623.86	1537.20	86.66	37.55
J-43			3)1624.86	1538.00	86.86	37.55
J-44			4)1626.91	1538.60	88.31	38.27
R- 1			1645.00	1550.00	95.00	41.17
					23.00	41.1/

#### SUMMARY OF INFLOWS AND OUTFLOWS

- (+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
  (-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE (gpm)	NODE TITLE	
R- 1	1136 17		

NET SYSTEM INFLOW = 1136.17

NET SYSTEM OUTFLOW = 0.00 NET SYSTEM DEMAND = 1136.17

# APPENDIX E: FIRE FLOW DEMANDS

Specified Minimum Pressure(psi or kPa): 20.00 Minimum Static Pressure(psi or kPa) : 20.00

Flow-1: Flowrate to maintain the specified

pressure at (hydrant) node Node-2: Node that has a lower pressure than specified value at Flow-1

Flow-2: Flowrate to maintain the specified pressure at Node-2

Hydrant	Elevation	Demand	Static			
Node		gpm	Pressure	Flow-1	Flow-2	Node-2
				gpm	gpm	
J- 2	1540.8	20.0	45.0	4139.7	<del></del>	
J- 3	1540.8	10.0	44.9	3439.3		
J- 4	1538.0	8.0	46.2	2035.7		
J- 5	1543.8	0.0	43.8	14219.5	14000 0	
J- 6	1537.3	11.5	46.4	1935.2	14099.9	J-11
J- 7	1541.1	9.0	44.7	3349.9		
J- 8	1542.7	8.0	44.2	4784.4	4701 0	
J- 9	1542.9	7.0	43.8	2525.2	4781.9	J-12
J-10	1539.1	11.5	45.5	2979.9	2010 0	
J-11	1543.9	6.0	43.5	2841.2	2948.3	J- 9
J-12	1543.9	9.0	43.5	3386.4		
J-13	1538.1	9.0	45.9	2651.6	0.631 0	
J-14	1537.8	13.0	46.0	2440.3	2631.3	J-38
J-15	1536.0	12.5	46.8	1646.8		
J-16	1538.2	20.0	45.8	2315.8	0204	
J-17	1538.1	12.0	45.8	1564.3	2304.4	J-38
J-18	1537.4	18.0	46.1	2162.3	0100	
J-19	1539.9	8.0	45.0	2107.5	2126.1	J-38
J-20	1536.3	8.0	46.6	1534.4		
J-21	1540.9	8.0	44.6	2281.1		
J-22	1536.2	2.9	46.6	2023.9	1070 4	
J-23	1537.0	8.0	46.3	1887.4	1970.4	J-38
J-24	1536.3	7.0	46.6	1537.5		
J-25	1535.6	7.0	46.9	1508.1		
J-26	1535.1	7.9	47.1	1850.5		
J-27	1535.0	6.0	47.1	1507.7		
J-28	1536.1	9.0	46.6	1833.7		
J-29	1535.5	6.9	46.9	1957.8	1000	
J-30	1539.9	5.0	45.0	1959.2	1906.6	J-38
J-31	1537.7	8.0	46.0	1972.6	1000 7	
J-32	1537.3	9.0	46.1	1885.5	1960.7	J-38
J-33	1536.9	5.0	46.3	1853.0	1862.7	J-38
J-34	1538.9	4.0	45.4	1890.7	1827.7	J-44
J-35	1536.7	8.1	46.4	1500.8	1886.6	J-38
J-36	1538.4	11.6	45.6	1483.6	1483.7	J-40
J-37	1539.6	5.0	45.1	1805.9	1478.6	J-40
J-38	1540.4	8.0	44.8	1531.2	1802.3	J-38
J-39	1539.5	10.0	45.1	1483.8		
J-40	1539.3	9.0	45.2	1387.0		
J-41	1538.5	8.0	45.6	1396.7		
J-42	1537.2	7.7	46.1	1499.5		
J-43	1538.0	8.0	45.8	1515.2		
J-44	1538.6	1.0	45.5	1655.3		
				1033.3		

#### ${\bf Appendix}\; {\bf B}$

Arizona Department of Environmental Quality
Administrative Code
Sewer Design Standards

#### Department of Environmental Quality - Water Pollution Control

to accommodate the new design flow; or

The sewer lines for a sewage collection system for a manufactured home, mobile home, or recrentional vehicle park are not less than fourinches in diameter for up to 29 units, fiveinches in diameter for 21 to 36 units, and sixinches in diameter for 37 to 60 units.

Design server lines with at least the minimum slope calculated from Manning's Formula using a coefficient of roughness of 0.013 and a scwage velocity of

two feet per second when flowing full.

An applicant may request a smaller minimum stops under R18-9-A312(G) if the smaller slope is justified by a quarterly program of inspections, flushings, and cleanings.

If a smaller minimum slope is requested, the slope shall not be less than 50% of that calculated from Manning's formula using a coefficient of roughness of 0.013 and a sewage velocity of two feet per second.

Design sower lines to avoid a slope that creates a sewage velocity greater than 10 feet per second. The applicant shall construct any sewer line carrying a flow with a normal velocity of greater than 10 feet per second using ductile iron pipe or pipe with equivalent crosion resistance, and structurally reinforce the receiving manhole or sewer main.

Design and install sewer lines, connections, and fittings with materials that meet or exceed manufacturer's specifications not inconsistent with this

Chapter to:

Limit inflows, infiltration, and exfiltration;

- · Resist corrosion in the project electrochemical environment:
- Withstand anticipated live and dead loads; and ly. Provide internal crossion protection.
- Indicate trenching and bedding details applicable for each pipe material and size in the design plans. Sewer lines shall be placed in trenches and bedded following the specifications established in subsections (D)(2)(h)(i) and (D)(2)(h)(ii) This moterial is incorporated by reference and does not include any later amendments or editions of the incorporated matter. Copies of the incorporated material are available for inspection at the Department of Environmental Quelity and the Office of the Secretary of State, or may be obtained from the Maricopa Association of Governments, 302 N. 1st Avenue, Suite 300, Phoenix. Arizona 85003, or from Pina County Wastervoter Management, 201 N. Stone Avenue, Tucson, Arizona 85701-1207.
  - "Trench Excavation, Backfilling, and Compaction" (Section 601), published in the "Uniform Standard Specifications for Public Works Construction," published by the Maricopa Association of Governments, revisions through 2000; and
- li. "Rigid Pipe Bedding for Sanitary Sewers" (WWM 104), and "Flexible Pipe Bedding for Sanitary Sewers" (WWM 105), published by Pima County Wastewater Management, revised November 1994.
- Perform a deflection test of the total length of all sewer lines made of flexible materials to ensure that the installation meets or excoods the Dinuulacturer's recommendations and record the results.

Test cuch segment of the sewer line for leakage using the applicable method below and record the results:

"Standard Test Method for Installation of Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air" published by the American Society for Testing and Materials, (F 1417-92), reapproved 1998;

"Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method' published by the American Society for Testing and Materials. (C 924-89), reap-

proved 1997;
"Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines" published by the American Society for Testing and Moterinis, (C 828-98), approved March 10, 1998; or

- iv. The nuterial listed in subsections (D)(2)(1)(1), (D)(2)(j)(ii), and (D)(2)(j)(iii) is incorporated by reference and does not include any inter amendments of editions of the incorporated matter. Copies of the incorporated material are available for inspection at the Department of Environmental Quality and the Office of the Secretary of State, or may be obtained from the American Society for Testing and Materials, 100 Barr Harbor Drive, Conshohocken, PA 19428-2959.
- Test the total length of the sewer line for uniform slope by lamp lighting, remote camera or similar method approved by the Department, and record the results.

Manholes.

'An applicant shall install metholes at all grade changes, all size changes, all alignment changes, all sewer intersections, and at any location necessary to comply with the following spacing requirements:

Sewer Pipe Diameter (inches)	Maximum ManboleSpacing (feet)
4 to less than 8	300
8 to less than 18	500
18 to less than 36	600
36 to Jess than 60	800
60 or greater	1300

The Department shall allow greater manhole spacing following the procedure provided in R1R-9-A312(G) if documentation is provided showing the operator possesses or line available specialized sewer cleaning equipment suitable for the increased spacing.

The applicant shall ensure that manhole design is consistent with "Pre-cast Concrete Sewer Manhole" (4420), "Offset Manhole for 8" - 30" Pipe" (#421), and "Brick Sewer Manhole and Cover Frame Adjustment" (#422), 1998, including revisions through 2000, published by the Maricopa Association of Governments; and "Manholes and Appurtenant Hems" (WWM 201 through WWM 211), Standard Details for Public Improvements, 1994 Edition, published by Pima County Wastewater Management.

The material specified in subsection (D)(3)(c) is incomparated by reference and does not include any later amendments or editions of the incorporated muter. Copies of the incorporated material are following rules. An applicant shall:

- a. Base design flows for components of the system on unit flows specified in Table 1, Unit Daily Design Flows. If documented by the applicant, the Department may accept lower unit flow values in the served area due to significant use of low flow fixtures.
- b. Use the "Uniform Standard Specifications for Public Works Construction," referenced in this Section and published by the Maricopa Association of Governments, revisions through 2000, or the "Pima County Wastewater Management," November 1994 Edition, as the applicable design and construction criteria, unless the Department approved alternative design standards or specifications authorized by a delegation agreement under A.R.S. § 49-107.
- c. Use gravity sewer lines, if appropriate. The applicant shall design gravity sewer lines and all other sewer collection system components, including force mains, manholes, lift stations, and appurtenant devices and structures to accommodate maximum sewage flows as determined by the method specified in subsections (D)(1)(c)(i) or (D)(1)(c)(ii) that yields the greatest calculated flow:
  - Any point in a sewer main when flowing full can accommodate an average flow of 100 gallons per capita per day for all populations upstream from that point; or
  - Any point in a sewer collection system can accommodate a peak flow for all populations upstream from that point as tabulated below:

Upstream Population	Peaking Factor
100	3.62
200	3.14
300	2.90
400	2.74
500	2.64
600	2.56
700	2.50
800	2.46
900	2.42
1000	2.38
1001 to 10,000	$PF = (6.330 \times p^{-0.231}) + 1.094$
10,001 to 100,000	PF = (6.177 x p <sup>-0.233</sup> ) + 1.128
More than 100,000	$PF = (4.500 \times p^{-0.174}) + 0.945$

PF = Peaking Factor p = Upstream Population

- d. Ensure the separation of sewage collection system components from drinking water distribution system components under R18-4-502.
- Request review and approval of an alternative to a design feature specified in this Section by following the requirements of R18-9-A312(G).
- 2. Gravity sewer lines. An applicant shall:
  - Ensure that any sewer line that runs between manholes, if not straight, is of constant horizontal curvature with a radius of curvature not less than 200 feet;
  - b. Cover each sewer line with at least three feet of backfill meeting the requirements of subsection (D)(2)(h)(i). The applicant shall:
    - i. Include at least one note specifying this requirement in construction plans;
    - ii. If site-specific limitations prevent three feet of earth cover, provide the maximum cover attainable, and construct the sewer line of ductile iron pipe or other materials of equivalent or greater tensile and compressive strength;
    - iii. If ductile iron pipe is not used, design and construct the sewer line pipe with restrained joints or an equivalent feature; and

- E. Installation requirements. An applicant shall ensure that:
  - The irrigation pipe is installed by a plow mechanism that cuts a furrow, dispenses pipe, and covers the irrigation pipe in one operation, or a trencher and hand tools that dig a trench not more than four inches wide.
  - Drip irrigation pipe has an incorporated herbicide to prevent root intrusion for at least 10 years and an incorporated bactericide to reduce bacterial slime build-up. The applicant shall store drip irrigation pipe to preserve the herbicidal and bactericidal characteristics of the pipe.
- F. Operation and maintenance requirements. In addition to the applicable requirements in R18-9-A313, the permittee shall test the fail-safe mechanism quarterly to prevent discharge of inadequately treated wastewater.

#### R18-9-E323. 4.23 General Permit: 3000 to less than 24,000 Gallons Per Day Design Flow

- A. A 4.23 General Permit allows on-site wastewater treatment facilities with a design flow from 3000 gallons per day to less than 24,000 gallons per day if all of the following apply:
  - Except as specified in subsection (A)(3), the treatment and disposal works consists of technologies or designs that are covered under other general permits, but are sized larger to accommodate increased flows.
  - 2. The on-site wastewater treatment facility complies with all applicable requirements of this Chapter.
  - 3. The facility is not a system or a technology covered by one of the following general permits available for a design flow of less than 3000 gallons per day:
    - a. An aerobic system with subsurface disposal, described in R18-9-E315.
    - b. An aerobic system with surface disposal, described in R18-9-E316,
    - c. A disinfection device, described in R18-9-E320,
    - d. A sequencing batch reactor, described in R18-9-E321, or
    - A seepage pit or pits, described in R18-9-E302,
- B. Notice of Intent to Discharge. In addition to the Notice of Intent to Discharge requirements specified in R18-9-A301(B), an applicant shall submit:
  - A performance assurance plan consisting of tasks, schedules, and estimated annual costs for operating, maintaining, and monitoring performance over a 20-year useful service life.
  - 2. Design documents and the performance assurance plan sealed by an Arizona-registered professional engineer.
  - 3. Any documentation submitted under the alternative design procedure in R18-9-A312(G) that pertains to achievement of better performance levels than those specified in the general permit for the corresponding facility with a design flow of less than 3000 gallons per day, or for any other alternative design, construction, or operational change proposed by the applicant.
- C. Additional Verification of General Permit Conformance requirements. In addition to any other requirements, the applicant shall submit the following information before the Verification of General Permit Conformance is issued.
  - A signed and sealed Engineer's Certificate of Completion in a format approved by the Department affirming that:
    - The project was completed in compliance with the requirements of this Section and as described in the plans and specifications, or
    - b. Any changes are reflected in as-built plans submitted with the Engineer's Certificate of Completion.
  - The name of a certified operator or service company that is responsible for implementing the performance assurance plan.
- D. Reporting requirement. The permittee shall annually provide the Department with:
  - . A form signed by the certified operator or service company that:
    - a. Provides any data or documentation required by the performance assurance plan.
    - b. Certifies compliance with the requirements of the performance assurance plan, and
    - c. Describes any additions to the system during the year that increased flows and certifies that the flow did not exceed 24,000 gallons per day during any day.
  - 2. Any applicable fee required by 18 A.A.C. 14.

Table 1. Unit Daily Design Flows

Type of Facility Served	Type of Facility Served  Applicable Unit  Passenger (average daily number)	
Airport		
	Employee	15
Apartment Building	Resident (if max. number fixed)	100
1 bedroom	Apartment	200
2 bedroom	Apartment	300
3 bedroom	Apartment	400
4 bedroom	Apartment	500

Auto Wash	Facility	Per manufacturer, if
		consistent with this
		Chapter
Bar/Lounge	Seat	30
Barber Shop	Chair	35
Beauty Parlor	Chair	100
Bowling Alley (snack bar only)	Lane	75
Camp		
Day camp, no cooking facilities	Camping unit	30
Campground, overnight, flush toilets	Camping unit	75
Campground, overnight, flush toilets and shower	Camping unit	150
Campground, luxury	Person	100-150
Camp, youth, summer or seasonal	Person	50
Church		
Without kitchen	Person (maximum attendance)	5
With kitchen	Person (maximum attendance)	7
Country Club	Resident Member	100
	Nonresident Member	10
Dance Hall	Patron	5
Dental Office	Chair	500
Dog Kennel	Animal, maximum occupancy	15
Hospital		
All flows	Bed	250
Kitchen waste only	Bed	25
Laundry waste only	Bed	40
Hotel/motel		
Without kitchen	Bed (2-person)	50
With kitchen	Bed (2 person)	60
Industrial facility	•	
Without showers	Employee	25
With showers	Employee	35
Cafeteria, add	Employee	5
Institutions		1
Resident	. Person	75
Nursing home	Person	125
Rest home	Person	125
Laundry		1
Self service	Wash cycle	50
Commercial	Washing machine	Per manufacturer, if consistent with this
		Chapter
Office Building	Employee	20
Park		
Picnic, with showers, flush toilets	Parking space	40
Picnic, with flush toilets only	Parking space	20
Recreational vehicle, no water or	Vehicle space	75
sewer connections		
Recreational vehicle, with	Vehicle space	100
water & sewer connections		
Mobile home/Trailer	Space	250

Residence Dwelling, per person (for sewer collection	Person	100
system design only)		
Dwelling, single family	Dwelling (3 bedrooms assumed)	450
Dwelling, per bedroom if count available	Bedroom	150
Dwelling, per fixture if count available	Fixture unit	25
Mobile home, family	Home lot	250
Mobile home, adults only	Home lot	150
Seasonal and summer	Resident	100
Restaurant/Cafeteria	Employee	20
With toilet, add	Customer	7
Kitchen waste, add	Meal	6 .
Garbage disposal, add	Meal	1
Cocktail lounge, add	Customer	2
Kitchen waste disposal service, add	Meal	2
Restroom, public	Toilet	200
School		
Staff and office	Person	20
Elementary, add	Student	15
Middle and High, add	Student	. 20
with gym & showers, add	Student	5
with cafeteria, add	Student	3
Boarding, total flow	Person	100
Service Station with toilets	First bay	1000
	Each additional bay	500
Shopping Center, no food or laundry	Square foot of retail space	0.1
Store	Employee	20
Public restroom, add	Square foot of retail space	0.1
Swimming Pool, Public	Person	10
Theater		
Indoor	Seat	5
Drive-in	Car space	10

Note: Unit flow rates published in standard texts, literature sources or relevant area or regional studies shall be considered by the Department, if appropriate to the project.

#### ARTICLE. 4. AGRICULTURAL GENERAL PERMITS

#### R18-9-401. Definitions

In addition to the definitions established in A.R.S. §§ 49-101 and 49-201, the following terms apply to this Article:

- "Application of nitrogen fertilizer" means any use of a substance containing nitrogen for the commercial production
  of crop plants. The commercial production of crop plants includes commercial sod farms and nurseries.
- "Crop plant needs" means the amount of water and nitrogen required to meet the physiological demands of the crop plant to achieve a defined yield.
- 3 "Crop plant uptake" means the amount of water and nitrogen that can be physiologically absorbed by the roots and vegetative parts of a crop plant following the application of water.

#### R18-9-402. Agricultural General Permits: Nitrogen Fertilizers

A person who engages in the application of a nitrogen fertilizer and is issued an agricultural general permit shall comply with the following agricultural best management practices:

- 1. Limit application of the fertilizer so that it meets projected crop plant needs;
- Time application of the fertilizer to coincide to maximum crop plant uptake;
- 3. Apply the fertilizer by a method designed to deliver nitrogen to the area of maximum crop plant uptake;
- 4. Manage and time application of irrigation water to minimize nitrogen loss by leaching and runoff; and
- Use tillage practices that maximize water and nitrogen uptake by crop plants.

#### R18-9-403. Agricultural General Permits: Concentrated Animal Feeding Operations

A person who engages in or operates a concentrated animal feeding operation and is issued an agricultural general permit shall comply with the following agricultural best management practices:

# EXHIBIT 7 2003 ANNUAL REPORT

# ARIZONA CORPORATION COMMISSION <u>UTILITIES DIVISION</u>

ANNUAL REPORT MAIL		

WS-02987A SEWER JOHNSON UTILITIES LLC 5320 E SHEA BLVD SCOTTSDALE, AZ 85254

#### ANNUAL REPORT

FOR YEAR ENDING

12 31 2003

FOR COMMISSION USE

1

#### **COMPANY INFORMATION**

Mailing Address 5320 E. SH	EA BLVD #200	
(Street)		05054
SCOTTSDALE (City)	AZ (State)	85254 (Zip)
(City)	(State)	(Егр)
480-998-3300	480-483-7908	
elephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Include Area Code)
mail Address		
mail Address	The second secon	
ocal Office Mailing Address	SAME	
	(Street)	
(City)	(State)	(Zip)
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mail Address		
	IANAGEMENT INFORMAT	ION
<u>M</u>	IANAGEMENT INFORMAT	ION
	IANAGEMENT INFORMAT  GEORGE JOHNSON	
<u>M</u> Management Contact:	IANAGEMENT INFORMAT  GEORGE JOHNSON (Name)	(Title)
<u>N</u>	IANAGEMENT INFORMAT  GEORGE JOHNSON	(Title) AZ 85254
Management Contact:	GEORGE JOHNSON (Name) SCOTTSDALE (City)	(Title) AZ 85254
Management Contact:	GEORGE JOHNSON (Name) SCOTTSDALE (City) 480-483-7908	(Title)  AZ 85254 (State) (Zip)
Management Contact:  5320 E. SHEA BLVD #200 (Street)  480-998-3300 Telephone No. (Include Area Code)	GEORGE JOHNSON (Name) SCOTTSDALE (City)	(Title) AZ 85254
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Management Contact:  5320 E. SHEA BLVD #200 (Street)  480-998-3300 Telephone No. (Include Area Code)  mail Address  On Site Manager:	GEORGE JOHNSON (Name)  SCOTTSDALE (City)  480-483-7908 Fax No. (Include Area Code)  BRIAN P TOMPSETT (Name)	(Title)  AZ 85254 (State) (Zip)
Management Contact:  5320 E. SHEA BLVD #200 (Street)  480-998-3300 Telephone No. (Include Area Code) Email Address On Site Manager:  SAME	GEORGE JOHNSON (Name)  SCOTTSDALE (City)  480-483-7908 Fax No. (Include Area Code)  BRIAN P TOMPSETT (Name)	(Title)  AZ 85254 (State) (Zip)  Pager/Cell No. (Include Area Code)
Management Contact:  5320 E. SHEA BLVD #200 (Street)  480-998-3300 Telephone No. (Include Area Code) Email Address On Site Manager:  SAME (Street)	GEORGE JOHNSON (Name)  SCOTTSDALE (City)  480-483-7908 Fax No. (Include Area Code)  BRIAN P TOMPSETT (Name)	(Title)  AZ 85254 (State) (Zip)
Management Contact:  5320 E. SHEA BLVD #200 (Street)  480-998-3300 Telephone No. (Include Area Code)  mail Address  On Site Manager:  SAME	GEORGE JOHNSON (Name)  SCOTTSDALE (City)  480-483-7908 Fax No. (Include Area Code)  BRIAN P TOMPSETT (Name)	(Title)  AZ 85254 (State) (Zip)  Pager/Cell No. (Include Area Code)

Statutory Agent: RICHAI	RD SALLQUIST		
	(Name)		
2525 E. AZ BILTMORE CIR #117	PHOENIX	AZ	85016
(Street)	(City)	(State)	(Zip)
(602)224-9222	Fax No. (Include Area Code	Pager/Cell No. (Inc	Slude Area Code)
Telephone No. (Include Area Code)	Pax No. (Include Area Code	ragencen No. (III	ciude Area Code)
Attorney: SAME			
	(Name)		
(Street)	(City)	(State)	(Zip)
Telephone No. (Include Area Code)	Fax No. (Include Area Code)	Pager/Cell No. (Inc	Tude Area Code)
Ō,	WNERSHIP INFORMATIO	N	
Check the following box that applies	to your company:		
Sole Proprietor (S)	C Corporation (C)	(Other than Assoc	ciation/Co-op)
Partnership (P)	Subchapter S Cor	poration (Z)	
Bankruptcy (B)	Association/Co op	(A)	
Receivership (R)	X Limited Liability C	ompany	
Other (Describe)			
	COUNTIES SERVED	<u>.</u>	
Check the box below for the county/ic	es in which you are certificated to pro	vide service:	
<b>П</b> АРАСНЕ	COCHISE		NINO
☐ GILA	☐ GRAHAM	GREE	NLEE
☐ LA PAZ	☐ MARICOPA	□ МОНА	VE
☐ NAVAJO	☐ PIMA	X PINAL	
☐ SANTA CRUZ	☐ YAVAPAI	☐ YUMA	us to some
☐ STATEWIDE		•	

#### UTILITY PLANT IN SERVICE

Acct. No.	DECRIPTION	Original Cost (OC)	Accumulated Depreciation (AD)	O.C.L.D. (OC less AD)
351	Organization			
352	Franchises		-	
353	Land and Land Rights	910,000	-	910,000
354	Structures and Improvements	453,663	38,181	415,482
355	Power Generation Equipment			
360	Collection Sewers - Force			
361	Collection Sewers - Gravity			
362	Special Collecting Structures			
363	Services to Customers			
364	Flow Measuring Devices			
365	Flow Measuring Installations			
370	Receiving Wells			
380	Treatment and Disposal Equip.			
381	Plant Sewers	17,432,240	1,007,341	16,424,899
382	Outfall Sewer Lines			
389	Other Plant and Misc. Equipment	5,455	68	5,387
390	Office Furniture and Equipment			
391	Transportation Equipment			
393	Tools, Shop and Garage Equip.			
394	Laboratory Equipment		•	
395	Power Operated Equipment			
398	Other Tangible Plant			
	TOTALS	18,801,358	1,045,590	17,755,768

This amount goes on the Balance Sheet Acct. No. 108

#### **CALCULATION OF DEPRECIATION EXPENSE**

Acct. No.	DESCRIPTION	Original Cost (1)	Depreciation Percentage (2)	Depreciation Expense (1x2)
351	Organization			
352	Franchises			
353	Land and Land Rights	910,000		
354	Structures and Improvements	453,663	2.5%	11,342
355	Power Generation Equipment			
360	Collection Sewers - Force			
361	Collection Sewers - Gravity			
362	Special Collecting Structures			
363	Services to Customers			
364	Flow Measuring Devices			
365	Flow Measuring Installations			•
370	Receiving Wells			
380	Treatment and Disposal Equip.			
381	Plant Sewers	17,432,240	2.5%	368,911
382	Outfall Sewer Lines		•	
389	Other Plant and Misc. Equipment	5,455	1.25%	68
390	Office Furniture and Equipment			
• 391	Transportation Equipment			
393	Tools, Shop and Garage Equip.	,		
394	Laboratory Equipment	·		
395	Power Operated Equipment			
. 398	Other Tangible Plant	·		
	SUBTOTAL	18,801,358		380,321
	CIAC Amortization			(210,899)
	TOTALS	18,801,358		169,422

This amount goes on Comparative Statement of Income and Expense Acct. 403



To the Board of Directors of The Sewer Division of Johnson Utilities, L.L.C. Scottsdale, Arizona

We have compiled the balance sheets (as restated) of The Sewer Division of Johnson Utilities, L.L.C. as of December 31, 2003 and 2002, and the comparative statements of income and expenses (as restated) for the years then ended included in the accompanying prescribed form in accordance with Statements on Standards for Accounting and Review Services issued by the American Institute of Certified Public Accountants.

Our compilation was limited to presenting in the form prescribed by the Arizona Corporation Commission information that is the representation of management. We have not audited or reviewed the financial statements referred to above and, accordingly, do not express an opinion or any other form of assurance on them.

These financial statements are presented in accordance with the requirements of the Arizona Corporation Commission, which differ from generally accepted accounting principles. Accordingly, these financial statements are not designed for those who are not informed about such differences.

All other information contained in the accompanying prescribed form has not been audited, reviewed, or compiled by us and, accordingly, we assume no responsibility for that information.

Wham + Company

ULLMANN & COMPANY, P.C. Certified Public Accountants

March 31, 2004

### COMPANY NAME JOHNSON UTILITIES, LLC

#### **BALANCE SHEET**

Acct.		BA	LANCE AT	BA	LANCE AT
No.		BEGINNING OF			END OF
	ASSETS	- T	EST YEAR	-	YEAR
	CURRENT AND ACCRUED ASSETS				
131	Cash	\$	410,535	\$	164,235
132	Special Deposits				
135	Temporary Cash Investments		·		
141	Customer Accounts Receivable		136,735		354,247
146	Notes/Receivables from Associated Companies		49,743		9,120
151	Plant Material and Supplies				
162	Prepayments			·	3,041
174	Miscellaneous Current and Accrued Assets		117,842		132,848
	TOTAL CURRENT AND ACCRUED ASSETS				
		\$	714,855	\$	663,491
	FIXED ASSETS				
101	Utility Plant in Service		13,444,334		18,801,358
103	Property Held for Future Use				70,257
105	Construction Work in Progress				5,502,892
108	Accumulated Depreciation - Utility Plant		665,269		1,045,590
121	Non-Utility Property		-		
122	Accumulated Depreciation - Non Utility				
	TOTAL FIXED ASSETS	\$	12,779,065	\$	23,328,917
	TOTAL ASSETS	\$	13,493,920	\$	23,992,408

NOTE: Total Assets on this page should equal Total Liabilities and Capital on the following page.

#### BALANCE SHEET (CONTINUED)

Acct.	LIABILITIES	BALANCE AT BEGINNING OF TEST YEAR		BEGINNING OF END OF		END OF
	CURRENT LIABILITES			_		
231	Accounts Payable	\$	583,407	\$	101,712	
232	Notes Payable (Current Portion)					
234	Notes/Accounts Payable to Associated Companies		28,312		171,798	
235	Customer Deposits					
236	Accrued Taxes		110,682		42,234	
237	Accrued Interest		50,316		1,690	
241	Miscellaneous Current and Accrued Liabilities					
	TOTAL CURRENT LIABILITIES	\$	772,717	\$	317,434	
	LONG-TERM DEBT (Over 12 Months)	<del>                                     </del>		-		
224	Long-Term Notes and Bonds	\$	236,585	\$	220,280	
	DEFERRED CREDITS					
252	Advances in Aid of Construction	\$	5,433,041	\$	10,242,183	
253	Other Deferred Credits	1				
255	Accumulated Deferred Investment Tax Credits					
271	Contributions in Aid of Construction		5,208,322		11,663,622	
272	Less: Amortization of Contributions		167,479		378,378	
281	Accumulated Deferred Income Tax	1				
	TOTAL DEFERRED CREDITS	\$	10,473,884	\$	21,527,427	
		<del> </del>		<del> </del>		
<u> </u>	TOTAL LIABILITIES	\$	11,483,186	\$	22,065,141	
	CAPITAL ACCOUNTS					
201	Common Stock Issued	\$	-	\$	-	
211	Other Paid in Capital		-			
215	Retained Earnings					
218	Proprietary Capital (Sole Props and Partnerships)		2,010,734		1,927,267	
	TOTAL CAPITAL	\$ .	2,010,734	\$	1,927,267	
-	TOTAL LIABILITIES AND CAPITAL	\$	13,493,920	\$	23,992,408	

#### JOHNSON UTILITIES, LLC

#### COMPARATIVE STATEMENT OF INCOME AND EXPENSE

	OPERATING REVENUES	PRI	OR YEAR	T	EST YEAR
521	Flat Rate Revenues	\$	576,672	\$	1,237,464
522	Measured Revenues				
536	Other Wastewater Revenues		39,700		
	TOTAL REVENUES	\$	616,372	\$	1,237,464
*.					
	OPERATING EXPENSES				
701	Salaries and Wages	\$	-	\$	-
710	Purchased Wastewater Treatment				
711	Sludge Removal Expense		851		2,685
715	Purchased Power		67,036	· ·	69,935
716	Fuel for Power Production				
718	Chemicals		661		
720	Materials and Supplies		8,400		2,904
731	Contractual Services - Professional		177,894		288,797
735	Contractual Services - Testing				
736	Contractual Services - Other				
740	Rents				28,236
750	Transportation Expense				134
755	Insurance Expense				6,951
765	Regulatory Commission Expense				
775	Miscellaneous Expense		3,911		9,994
403	Depreciation Expense		192,300		16,422
408	Taxes Other Than Income				501
408.11	Property Taxes		30,692	1	17,215
409	Income Taxes				
	TOTAL OPERATING EXPENSES	\$	481,745	\$	443,774
	OTHER INCOME/EXPENSE				
419	Interest and Dividend Income	\$	3,492	\$.	4,479
421	Non-Utility Income	<del>                                     </del>	-,··-		
426	Miscellaneous Non-Utility Expenses	1			
427	Interest Expense		29,502	1	19,011
	TOTAL OTHER INCOME/EXP	\$	(26,010)	\$	(14,532)
<del></del>			(=-,-2-)	<del>                                     </del>	
	NET INCOME/(LOSS)	\$	108,617	\$	779,158

#### COMPANY NAME

#### SUPPLEMENTAL FINANCIAL DATA Long-Term Debt

	LOAN #1	LOAN #2	LOAN #3	LOAN #4
	Various	4/9/03		
Date Issued				
Source of Loan	Member	Grissom		
ACC Decision No.				
Reason for Loan	Capital Impr.	Land Purchase		
Reason for Loan				
Dollar Amount Issued	\$233,280	\$35,000	\$	\$
Amount Outstanding	\$185,280	\$35,000	\$	\$
Date of Maturity	Demand	4/15/05		
Interest Rate	8%	8%	%	%
Current Year Interest	\$18,589	\$0	\$	\$
Current Year Principle	\$48,000	\$0	\$	\$

#### WASTEWATER COMPANY PLANT DESCRIPTION

#### TREATMENT FACILITY

TYPE OF TREATMENT	EXTENDED AERATION, AEROBIC LAGOONS
(Extended Aeration, Step Aeration, Oxidation	
Ditch, Aerobic Lagoon, Anaerobic Lagoon,	
Trickling Filter, Septic Tank, Wetland, Etc.)	
DESIGN CAPACITY OF PLANT	1.6 MGD
(Gallons Per Day)	

#### LIFT STATION FACILITIES

Location	Quantity of Pumps	Horsepower Per Pump	Capacity Per Pump (GPM)	Wet Well Capacity (gals)
MAIN PUMP STATION	2	30	325	7500
REUSE PUMP STATION	2	30	420	1879
UNIT 4A PUMP	2	75	400	380
UNIT 4D/4F PUMP STATION	2	18	656	1184
UNIT 6 PUMP STATION	2	3	100	440
OASIS @ MAGIC RANCH PUMP STATION	2	7.5	593	887
SUPERSTITION VIEWS	2	7.5	90	440
OASIS SUNRISE	2	15 ·	500	2162
SAN TAN PUMP STATION	2	75	500	7500
COPPER BASIN PUMP STATION	2	30	380	7780
CIRCLE CROSS PUMP STATION	2	50	500	2256
PECAN RANCH PUMP STATION	2	75	500	2162
AD & AF	2	45	440	1879
COPPER BASIN #2	2	88	500	1879
RANCHO BELLA VISTA	2	47	500	1879
RANCHO BELLA VISTA #2	2	45	500	1879

#### FORCE MAINS

Size	Mater	ial Length (Feet)
4-inch	PVC	2,704
6-inch	PVC	6,610
8-inch	PVC	100,042
15-inch	PVC	1,126
12-inch	PVC	4,770
10-inch	PVC	1,973

#### **MANHOLES**

Туре	Quantity
Standard	1183
Drop	5

#### **CLEANOUTS**

	Quantity	
256		

0

#### WASTEWATER COMPANY PLANT DESCRIPTION CONTINUED

#### **COLLECTION MAINS**

#### **SERVICES**

Size (in inches)	Material	Length (in feet)
4		
6		9467
8		251061
10		19309
12		22620
15		1126
18		2800
21		
24		
30		
:		

Size (in inches)	Material	Quantity
4		6006
6		2
8		
12		
15		
-		
		·

#### FOR THE FOLLOWING FIVE ITEMS, LIST THE UTILITY OWNED ASSETS IN EACH CATEGORY

SOLIDS PROCESSING AND HANDLING FACILITIES	NONE
DISINFECTION EQUIPMENT (Chlorinator, Ultra-Violet, Etc.)	6 CHLORINATORS
FILTRATION EQUIPMENT (Rapid Sand, Slow Sand, Activated Carbon, Etc.)	NONE
STRUCTURES (Buildings, Fences, Etc.)	FENCES – 12 WELL SITES, 6 WATER PLANTS, 11 LIFT STATIONS. 1 WWTP.
OTHER (Laboratory Equipment, Tools, Vehicles, Standby Power Generators, Etc.	3 GENERATORS, 1 BACKHOE, 1 BULL DOZER

#### WASTEWATER FLOWS

MONTH/YEAR (Most Recent 12 Months)	NUMBER OF SERVICES	TOTAL MONTHLY SEWAGE FLOW	SEWAGE FLOW ON PEAK DAY
January 2003	1769	4,528,000	160,000
February 2003	1900	4,645,000	167,000
March 2003	2054	4,977,000	196,000
April 2003	2226	4,655,000	170,000
May 2003	2384	4,908,000	196,000
June 2003	2595	5,262,000	192,000
July 2003	2699	5,806,000	195,000
August 2003	2960	10,200,000	350,000
September 2003	3140	10,717,000	360,000
October 2003	3400	11,408,000	408,000
November 2003	3461	11,526,000	603,000
December 2003	3719	12,199,000	597,000
			1

#### PROVIDE THE FOLLOWING INFORMATION AS APPLICABLE

Method Of Effluent Disposal	Recharge
(leach field, surface water discharge, reuse, injection wells, groundwater recharge, evaporation ponds, etc.)	Evaporation
Wastewater Inventory Number	103081
(all wastewater systems are assigned an inventory number)	
Groundwater Permit Number	58-106857.0005, 58-113322.0004
ADEQ Aquifer Protection Permit Number	P103081
ADEQ Reuse Permit Number	R103081
EPA NPDES Permit Number	N/A

#### STATISTICAL INFORMATION

Total number of customers	3719	
Total number of gallons treated	90,831,000	gallons

## 41472JB

# JOHNSON UTILITIES COMPANY PLANT INVENTORY WASTEWATER

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	Project	10 Mailes	Pickell Di					35,800			-		-	6	
	Main Gunt Station						500	4300				-			
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, X	JR Trunk Sewer		8				GB P	_				†	l	ŀ	
44.8	4A Station	١			+	-		18 477				•	+	+	
2	San Tan Force Lift Sta & Force Min							A 750					+	+	
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	A LABATER				-	010	3	1				2		-	8
2000	Sec 11 WWY							28,200		200			-		
70	Pecan Ranch Pump Sta & Force Mn					3				8		1	$\mid$		
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8	Copper Basin Pranto Sta and Italia Mil							5733							
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# 4V74/2VVA

# JOHNSON UTILITIES COMPANY PLANT INVENTORY WASTEWATER

# TREATMENT DI ANTS

エレン	クロングリーとしていること					
	e EL CA	GPD	1 of Size		Desded to JUC?	d rax 12 Parcel
	Cobreen Ranch Main WANTS	1 RM	87 Acres		Gen Hunt	200-24-003D5 (77 287 Ac
	Precision	J. P.	37 AC		13 Lanc to	יייים ביים עדי מינים בי המחירות
	Marwood	Retired	N.A			

# LIFT STATIONS

		Number			Wet Well	Deeded	Тах
Neme	Location	Pumps	Horsepower	GPM each	Capacity	to JUC?	Parcel
Main Station	Water Plant #1	2	8	325	7500		
Station4A	JR Chit 4	N	7.6	158	380		
Station 6	JR Unit 6	2	60	100	440		
San Tan Station	San Tan Unit XX	2	25	200	7500		
Pecan Station	Pecen RanchUnit XX	2	75	200	1879		
Reuse Station	Main WWTP	2	30	420			
Superstation Views	Superstition Views	2	7.5	06	440		
4D/4F	JR Unit 40/4F	2	ਦਾ				
Copper Basin	Copper Basin Devel	2	30	. 380	1688		
Copper Basin	Copper Basin Davel	2	88	380	3750		
Circle Cross	Cícle Cross Devel	2	220	500	1879		
Magic Ranch Phase 1	Magic Ranch Phase 1	2	7.5	593			
Oasis Sunrise	Oasis Sunrise Devel	2	15	500	1879		
Momine Sun Farms	Morning Sun Farms	2	47		-		

Johnson Utility Company Plant Inventory Awastewater

ON-SITE MAINS								7	100 10	HW W H TO		AS .00	48
Subdivision.	er Martin	47 Mahs	tr. Maine	ST Probe	8	The state of the s	SERVICE			8		-	
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JRUMS										18		ā	
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JR Unit 48						1,660	L			Ē	-	3	Ì
JR OAR 6			¥		T	# 40°	Ĺ			88		9	
LE CASE			ğ			9064	18			Z	1	9	T
10112410			1212			8,370			·	8	1	9	T
JR 1164 43						8,887				8	1		T
A skewjew Gardens						2273				7	Ť	4	T
JR Units 40 & F						14,418	1,708			1		2	T
JR Uni 18						1				3	2		T
JR Unit 18 1,2,3			9	46		8,148				7	2	1	T
JR Unit (452 1.2					1,836	6,378				R	2	0	T
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R 11rd 41 & 47						3,400				R		+	Ī
19 Link 404 48 \$ 40						4,500				8		1	T
19 110# 34	-					2,548				-		-	T
IR Colf Course												1	T
Ban Tan OS Na Parceis A & B	1,220		833	₩.		8,543				2	7	1	
San Tan Parmet A					180	3,760				6	•		1
San Tan Persel A					98	4.23		·		3		2	T
San Tan OS Min Parcels C.D. & E.	88					1.140				2	i	7:	T
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Sun Tan Parcel L	-			·		\$				1			Ī
Johnson Holdings/Tosco						3				200	-	-	Γ
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A 25-20 - 4-20 T			Ş	22/1		4.489				6)	8	6	
Circle Cross Partial 5			208			3,802			·	18	=	•	
Corner Besin (70) 2						3,778				9		+	
Ossis at Medic Ranch				1,469	338	7,704				B	2	•	
Desig Searings				382		8,485	888			R		•	
Milage at Magic				1,829	3,548					2		+	
Sehool			82							1	ľ	-	
Sircle Cross Coff Rd			1,752	3		8					1	1	
Worning Sun Farms MC						No.				, A	'n	$ar{1}$	2
Noming Sun Farms Pin I	280		7000		\$	200				2			
Superstition Views		20	2017			1,890	2,006			8	4	13	
				L.,								+	ľ
Total	3,080	167	17,850	19,309	8,790	251,061	9,467		. • 	9	170	<u>z</u>	N
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						-							

#### **INCOME TAXES**

For this reporting period, provide the following	·		
Federal Taxable Income Reported Estimated or Actual Federal Tax Liability	N/A (LLC) N/A (LLC)		
State Taxable Income Reported Estimated or Actual State Tax Liability	N/A (LLC) N/A (LLC)		
Amount of Grossed-Up Contributions/Advance	s:		•.
Amount of Contributions/Advances Amount of Gross-Up Tax Collected Total Grossed-Up Contributions/Advances	0 0	<del></del>	
close of the tax year when tax returns are con are due to any Payer or if any gross-up tax information by Payer: name and amount of cothe amount of refund due to each Payer, and to the Payer.  CERTIFICATION	refunds have alread intribution/advance, t	ly been made, atta he amount of gross	ch the following -up tax collected,
The undersigned hereby certifies that the Utilities in the prior year's annual report. This certific Officer, if a corporation; the managing generalimited liability company of the sole proprietor SIGNATURE	cation is to be signed ral partner, if a partn	by the President on ership; the manag	r Chief Executive
GEOME H. JOHNSON PRINTED NAME	HANAGER		

COMPANY NAME_	JOHNSON UTILITIES, LLC		YEAR	R ENDING 1	2/31/2003
	PROPER'	IY TAXES			
Amount of actual prope	erty taxes paid during Calendar Y	Year 2003 was: \$_	251,456		
Attach to this annual reproperty tax payments)	port proof (e.g. property tax bill of any and all property taxes pa	s stamped "paid in id during the calen	full" or copie dar year.	s of cancelled	checks fo
Attach to this annual reproperty tax payments)	port proof (e.g. property tax bill of any and all property taxes pa	s stamped "paid in id during the calen	full" or copie dar year.	s of cancelled	checks fo
property tax payments)	of any and all property taxes pa	s stamped "paid in id during the calen	full" or copie dar year.	s of cancelled	checks fo
property tax payments)	of any and all property taxes pa	s stamped "paid in id during the calen	full" or copie dar year.	s of cancelled	checks fo
Attach to this annual reproperty tax payments)  If no property taxes pa	of any and all property taxes pa	s stamped "paid in id during the calen	full" or copie dar year.	s of cancelled	checks fo

# VERIFICATION AND SWORN STATEMENT

**Intrastate Revenues Only** 

VERIFICATION

STATE OF ARIZONA

I. THE UNDERSIGNED

OF THE

COUNTY OF (COUNTY NAME)

MARICOPA

NAME (OWNER OR OFFICIAL) TITLE

GEORGE H. JOHNSON

COMPANY NAME

JOHNSON UTILITIES L.L.C. - SEWER DIVISION

#### DO SAY THAT THIS ANNUAL UTILITY REPORT TO THE ARIZONA COPRORATION COMMISSION

FOR THE YEAR ENDING

 MONTH
 DAY
 YEAR

 12
 31
 2003

HAS BEEN PREPARED UNDER MY DIRECTION, FROM THE ORIGINAL BOOKS, PAPERS AND RECORDS OF SAID UTILITY; THAT I HAVE CAREFULLY EXAMINED THE SAME, AND DECLARE THE SAME TO BE A COMPLETE AND CORRECT STATEMENT OF BUSINESS AND AFFAIRS OF SAID UTILITY FOR THE PERIOD COVERED BY THIS REPORT IN RESPECT TO EACH AND EVERY MATTER AND THING SET FORTH, TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

#### **SWORN STATEMENT**

IN ACCORDANCE WITH THE REQUIREMENT OF TITLE 40, ARTICLE 8, SECTION 40-401, ARIZONA REVISED STATUTES, IT IS HEREIN REPORTED THAT THE GROSS OPERATING REVENUE OF SAID UTILITY DERIVED FROM ARIZONA INTRASTATE UTILITY OPERATIONS DURING CALENDAR YEAR 2003 WAS:

(THE AMOUNT IN BOX ABOVE INCLUDES \$ 86,548 IN SALES TAXES BILLED, OR COLLECTED

\*\*REVENUE REPORTED ON THIS PAGE MUST INCLUDE SALES TAXES BILLED OR COLLECTED. IF FOR ANY OTHER REASON, THE REVENUE REPORTED ABOVE DOES NOT AGREE WITH TOTAL OPERATING REVENUES ELSEWHERE REPORTED, ATTACH THOSE STATEMENTS THAT RECONCILE THE DIFFERENCE, (EXPLAIN IN DETAIL)

SUBSCRIBED AND SWORN TO BEFORE ME

A NOTARY PUBLIC IN AND FOR THE COUNTY OF

THIS

NANCEE P. IRWIN

MANCEE P. IRWIN

MANCEE P. IRWIN

(SEAL)

DAY OF

y 20, 2005

MARICOPY

20 474

SIGNATURE OF NOTARY PUBLIC

DAYOR

/

MY COMMISSION EXPIRES

#### VERIFICATION AND SWORN STATEMENT RESIDENTIAL REVENUE

VERIFICATION

INTRASTATE REVENUES ONLY

STATE OF ARIZONA	(COUNTY NAME) MARICOPA	
I, THE UNDERSIGNED	NAME (OWNER OR OFFICIAL) GEORGE H. JOHNSON	TITLE PRESIDENT '
OF THE	COMPANY NAME JOHNSON UTILITIES L.L.C. – SEWER DIVISION	

DO SAY THAT THIS ANNUAL UTILITY REPORT TO THE ARIZONA CORPORATION COMMISSION

FOR THE YEAR ENDING

MONTH DAY YEAR 31 2003 12

HAS BEEN PREPARED UNDER MY DIRECTION, FROM THE ORIGINAL BOOKS, PAPERS AND RECORDS OF SAID UTILITY: THAT I HAVE CAREFULLY EXAMINED THE SAME, AND DECLARE THE SAME TO BE A COMPLETE AND CORRECT STATEMENT OF BUSINESS AND AFFAIRS OF SAID UTILITY FOR THE PERIOD COVERED BY THIS REPORT IN RESPECT TO EACH AND EVERY MATTER AND THING SET FORTH, TO THE BEST OF MY KNOWLEDGE, INFORMATION AND BELIEF.

#### SWORN STATEMENT

IN ACCORDANCE WITH THE REQUIREMENTS OF TITLE 40, ARTICLE 8, SECTION 40-401.01, ARIZONA REVISED STATUTES, IT IS HEREIN REPORTED THAT THE GROSS OPERATING REVENUE OF SAID UTILITY DERIVED FROM ARIZONA INTRASTATE UTILITY OPERATIONS RECEIVED FROM RESIDENTIAL CUSTOMERS DURING CALENDAR YEAR 2003 WAS:

ARIZONA INTRASTATE GROSS OPERATING REVENUES  1,312,740	(THE AMOUNT IN BOX AT LEFT INCLUDES \$ 85,811 IN SALES TAXES BILLED, OR COXLECTED
*RESIDENTIAL REVENUE REPORTED ON THIS MUST INCLUDE SALES TAXES BILLED. X	PAGE  SIGNATURE OF OFFICIAL

SUBSCRIBED AND SWORN TO BEFORE ME

A NOTARY PUBLIC IN AND FOR THE COUNTY OF the DAY OF THIS OFFICIAL SEA NANCEE P. IRWIN

1.5 Comm. Expires 5-20-2005 MY COMMISSION EXPIRES

SE ALPIGOPA COUNTY

My 20,2005

20 0

SIGNATURE OF NOTARY

### **EXHIBIT 8**

# APPROVAL OF CONSTRUCTION

**PENDING** 

ADEQ

REVIEW